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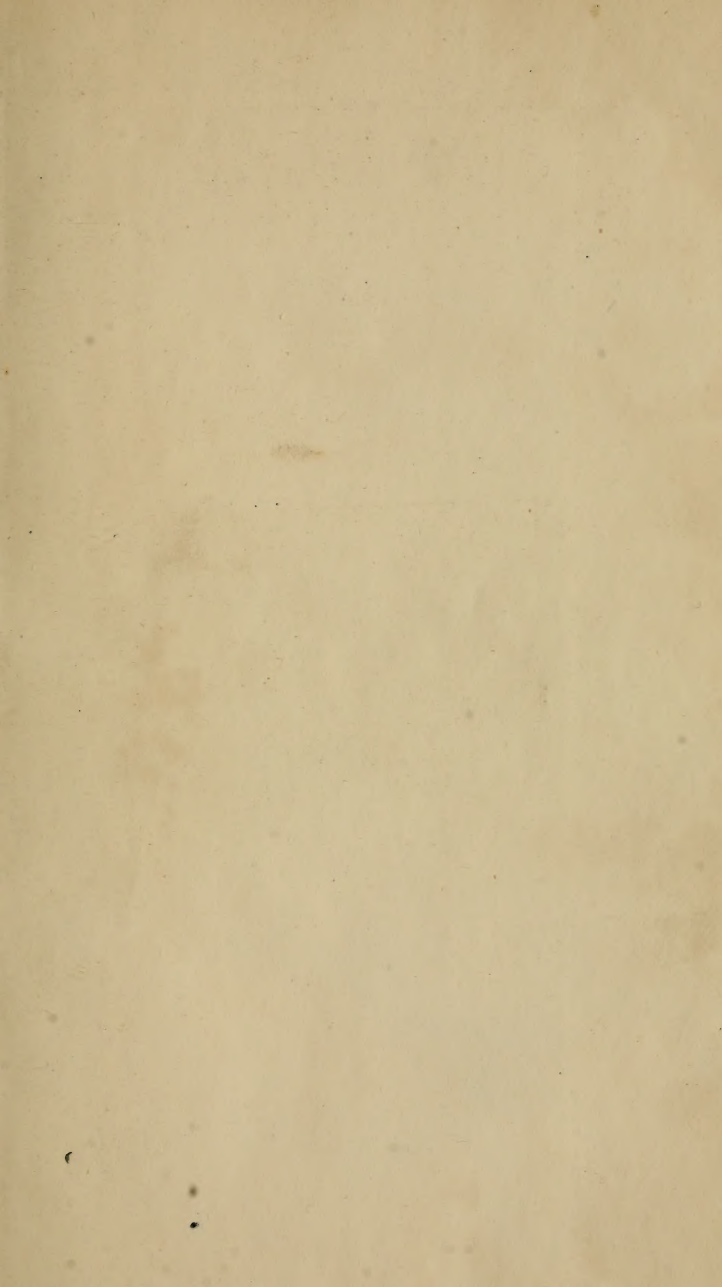


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WITH A CHAPTER ON

Ornamental Trees and Shrubs.

BY THE AUTHOR OF

“HOW TO WRITE,” “HOW TO BEHAVE,” ETC.

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Gardening was the primitive employment of the first man; and the first of men, among his
descendants, have ever been attached to that occupation. Indeed, we can hardly form an idea
of human felicity, in which a garden is not one of its most prominent characteristics.—T. G.
FESSENDEN.

New York:

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P R E F A C E .

THERE are many excellent works on Gardening in the English language ; but there seemed to be room and a demand for another. No other work fills just the place that this is intended to fill—no other quite meets the popular want which we have aimed to satisfy in this.

We saw the need of a small, cheap work, embracing not only brief, simple, and easily understood directions for the cultivation of vegetables, fruits, and flowers, but also a succinct exposition of the theory of horticulture, as deduced from the nature of soils and manures, and the laws of vegetable life and growth ; to give the reader something to fall back upon, whenever the practical instructions, which can not be adapted to every change of circumstances, shall fail to furnish a sufficient guide. How well we have succeeded in meeting this need we leave the reader to judge. We will only say, that our little book has been carefully prepared, and combines the results of experience, observation, and study. In preparing it, we have aimed simply at *usefulness*, and have made no effort for the attainment of any further originality than the end in view required. We are necessarily placed under heavy obligations to our predecessors in the walks of horticultural literature ; but what we have derived from them has, in most cases, been re-written, and so modified, to adapt it to our purpose, that formal credit has, except in a few

instances, been impracticable. Among the numerous works consulted, we take pleasure in acknowledging our indebtedness for valuable aid to each and all of the following :

- *Loudon's Encyclopedia of Gardening.
- *Mrs. Loudon's Gardening for Ladies
- Delamer's Kitchen Garden.
- “ Flower Garden.
- Neill's Gardener's Companion.
- *Buist's Family Kitchen Gardener.
- Fessenden's American Kitchen Gardener.
- Every Lady Her Own Flower Gardener.
- Barry's Fruit Garden.
- *Downing's Fruits and Fruit-Trees.
- *Jaques' Fruits and Fruit-Trees.
- Tucker's Annual Register.
- Farm and Garden Essays.
- Thorburn's Descriptive Catalogues.
- *White's Gardening for the South.
- Horticulturist.
- Country Gentleman.
- *Southern Cultivator.
- Allen's American Farm Book.
- Boussingault's Economie Rurale.
- Downing's Landscape Gardening.
- *Lindley's Theory of Horticulture.
- Gray's Botanical Text-Book.
- *Darby's Botany of the Southern States.

To the works marked thus (*) we are under special obligations, either for matter derived from them, or for valuable facts or suggestions made more indirectly available.

Trusting that this little manual will be found worthy of a measure of the favor with which his previous humble attempts at usefulness has been received, the author now submits it to the judgment of the great Public.

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INTRODUCTION.

It is written that God placed the first man in a garden to dress and to keep it; and that woman was there created as a help meet for him. That garden was the primitive paradise; and to this day, a tastefully planned, judiciously planted, and well-kept garden has, still lingering about it, many of the charms we are wont to attribute to the original Eden. To the true lover of rural life it seems, in the fullness of its summer beauty, to be indeed almost a Paradise Regained.

Gardens are frequently mentioned in ancient writings, both sacred and profane, but little is told us either of their productions or their cultivation.

At the close of the Roman commonwealth the catalogue of cultivated fruits had become considerable, and the principles of pruning and grafting were understood and practiced. With the decline of the empire, horticulture, in common with other useful arts, seems to have declined, and to have revived only when learning arose from the slumber of the dark ages. Since that time, it has kept pace with the general improvement of society. England, France, and Belgium have taken the lead in modern horticultural progress. The United States will not long remain behind.

It would be interesting to trace, at considerable length, the

history of gardening, and show how, both as an art and as a science, it has been perfected, step by step, by means of study, observation, and experiment; but our limits will not permit this course, and we must refer the inquiring reader to "Loudon's Encyclopedia of Gardening," the most thorough and complete work on the subject in the English language. It is, however, too large and expensive to be generally accessible, except in public libraries.

Gardening, the earliest employment of man, is also the most attractive. It is Emerson, we think, who says, that after working in one's garden, nothing else seems worth doing. Here we seem to come into close communion with Nature, and to co-operate with her in adorning and enriching the earth. To plant one's seeds, to await hopefully their germination, to watch the daily development of the tender plant, to protect it from the encroachments of weeds and the attacks of insects, to loosen the soil around it, to care for it, watch over it, and rejoice in its growth and fruitage, and finally to enjoy the fruits of one's labors in the ripened harvest—what mere sensuous pleasure can be greater? The market affords no such pears, apples, peaches, or plums as grow on the trees we have with our own hands grafted and pruned. Our own squashes and melons are sweeter than any that our money could buy; and no potatoes, or cabbages, or turnips are like ours!

And health flows to us from the garden in two broad streams. One has its source in the invigorating out-door exercise it calls for and renders so delightful, and the other in the wholesome food which it furnishes to take the place of much less desirable aliments which would otherwise be supplied by the butcher and the grocer.

A taste for horticulture is almost universal in this country, and, as land is abundant and cheap, and the facilities for obtaining it great, very few outside of our cities and large towns are debarred from gratifying it, to a greater or less extent.

But a knowledge of the science of horticulture is far from being co-extensive with the practice of the art, and a truly satisfactory degree of success is only occasionally attained. A rich soil and a genial climate conspire to render the rudest and most empirical cultivation, under favorable circumstances, moderately productive. Plodding industry, however blindly applied, is looked upon with favor by all-loving Nature ; but her richest gifts are reserved for united science and skill. In the cultivation of the earth, as in every other department of human effort, "knowledge is power."

To increase and extend a knowledge of the theory and practice of gardening is the object of the following pages, in which we have given due attention to both branches of the subject. The former is almost entirely ignored in most popular works on horticulture ; they being nearly restricted to details of practice. These, though highly useful and even essential to the novice, are liable to lead him frequently astray, unless he is guided in their application by a knowledge of the principles on which they are founded.

The theoretical part of our work is necessarily brief, but will be found a useful auxiliary to the practical directions which follow. Carefully studied, thoroughly mastered, and constantly applied, it will be of more value to the reader than a heavy volume imperfectly understood and confusedly remembered. We would by no means, however, discourage those who have the leisure and disposition from pursuing the subject further.

NOTICE TO THE READER.

IN making use of the practical directions given in this work, the reader should bear in mind that it was written in southern New York, and that where no other place or latitude is mentioned, in designating the time for planting seeds, etc., about 40° N., with a very slight elevation above the sea, is to be understood. Allowance must be made for situation north or south of this, and also for elevation of site, soil, aspect, exposure, and the general character of the season.

Our directions must also, of necessity, be subject to many modifications, in other respects, by soil, situation, and climate; but if the reader will study the general principles of horticulture, even in our brief and imperfect exposition of them, in the first part of this work, and exercise a little sound judgment, he will readily overcome the obstacles presented by local and temporary circumstances.

In giving the names of the varieties of fruits, we have followed Downing, as the best American authority; although he occasionally differs from the American Pomological Society.

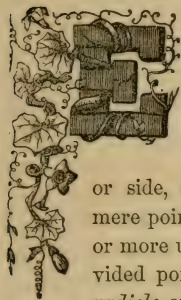
THE GARDEN.

I.

STRUCTURE AND GROWTH OF PLANTS.

With what increased satisfaction are the common processes of manuring or transplanting carried on, to say nothing of the more delicate operations of budding, grafting, and propagating by layers, etc., when we are acquainted with the structure of the plants we are endeavoring to control, and comprehend the why and the wherefore of every step we pursue.—*A. J. Downing.*

I.—GERMINATION.



VERY perfect and matured seed contains the germ of a new plant of the species to which it owes its own existence. If you separate the two lobes of a bean, or other seed of a similar character, you will discover, pressed between them at the undivided or stem end, or side, a minute kernel or bud. This, though a mere point, as it were, contains the rudiments of two or more undeveloped leaves, united by a solid or undivided portion, called, in the language of botany, the *radicle*, and constitutes an embryo plant, holding within itself all the elements of vegetable life. The commencement of the vital action which produces the development of this embryo is called *germination*.

The conditions essential to germination are the presence of *moisture*, *warmth*, and *oxygen gas*.

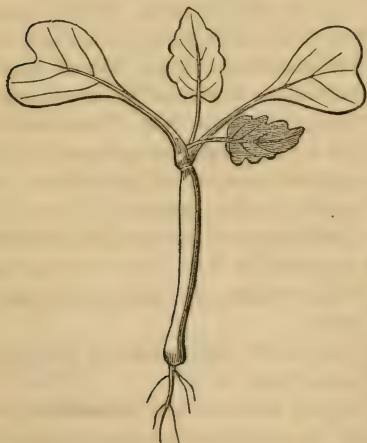
In the absence of moisture, no effect toward germination is produced by the presence of warmth and oxygen, or any other gas. Moisture and oxygen gas, without warmth, are equally

inefficacious; and so are moisture and warmth in the absence of the oxygen; for seeds will not germinate in a vacuum, nor in distilled or recently boiled water.

Moisture is necessary to soften and expand the various parts, to dissolve soluble matter, and to establish a sort of circulation. The embryo seems also to have the power of decomposing water; and it is probable that a portion of the oxygen required is obtained in this way. The rest must come from the air; for it is found that a communication with the atmosphere is absolutely essential to perfect germination. The effect of heat appears to be to set the vital principle in action, to expand the air in the numerous microscopic cavities of the seed, and to produce distension of all the organic parts. The degree of heat required varies with different species. The common chickweed will germinate at a temperature but little above the freezing-point, while the seeds of many tropical plants require a heat of from 90° to 110° (Fahrenheit) to call them into action. Wheat, rye, and barley will germinate at 44° . A

degree of heat varying from 113° to 167° is capable of destroying the vitality of the various grains, beans, peas, etc. Direct light, so essential to subsequent vegetation, is unfavorable to germination.

The time required for germination is very different in different species of plants. Much also depends upon soil, climate, degree of



YOUNG RADISH, SHOWING SEED-LEAVES.

moisture, etc. Under favorable circumstances, wheat, rye, oats, and millet will germinate in one day; bean, turnip, radish, and mustard in three days; lettuce in four days; melon, cucumber, squash, and pumpkin in five days; barley in seven; cabbage in ten; parsley in fifteen; almond, peach, and peony in one year, and hawthorn in two years.

The time that seeds will retain their vitality also differs in different species, but in all cases depends partly upon the degree in which they are excluded from the action of moisture and light. Kidney-beans, peas, and carrot, parsnep, and rhubarb seeds are generally considered as losing their vitality at the end of one year, but will sometimes germinate after being kept much longer.

These facts have important bearings upon the subject of horticulture, and should be constantly borne in mind; and especially is it requisite that the essential conditions of germination be held in remembrance. A failure to germinate is doubtless often attributed to bad seeds, when the fault is entirely in the planting. It must be perfectly evident that if your seeds are insufficiently covered in a light, dry soil, they will lack the first essential of germination, and will be liable to wither and perish for want of moisture. This is why light soils should be pressed together and upon the seed in planting, either by means of a roller or otherwise. Seeds buried too deeply, or covered with a heavy, dense soil, pressed too closely upon them, fail to germinate for want of communication with the atmosphere. If there be not sufficient warmth in the soil at the time of planting, and it remain cold for a considerable time thereafter, the seeds just as surely perish. Remember the conditions of germination—moisture, warmth, and oxygen gas (or air containing oxygen).

Germination being established by the action of moisture and warmth, and maintained by the oxygen of the atmosphere, all parts of the embryo enlarge, and new parts are formed at the expense of a saccharine or sugary secretion, which the germinating seed possesses the power of forming. With the assistance

of this substance, the root or radicle, at first a mere rounded cone, extends and pierces the earth in search of food, while the other extremity elongates in the opposite direction, bringing the *cotyledons*, or seed-leaves (except when these remain permanently in the ground, as in the pea, wheat, rye, etc.), and the rudimentary leaves and stem, to the surface of the soil. The process of germination is now completed—the plant is born.

II.—THE ROOT.

The root, the stem, and the leaves are called the fundamental organs of plants. Of them vegetables essentially consist; and the various organs known by other names are really but repetitions, under more or less modified forms, of these essential parts.

Germination, as we have seen, pushes the root downward into the earth, where, extending *by the addition of new matter to its point*, it soon enters upon the exercise of its function—the *absorption of the crude food of the plant from the soil*. This is carried up through the stem into the leaves, to be digested or assimilated, and returned to the stem and root, and used in the formation of new branches, leaves, and rootlets, as well as for increasing the length and size of those already formed. The more a plant grows, therefore, the more are the means of growth multiplied.

As the roots are extended by the addition of new matter to the extreme points, these points are exceedingly delicate and easily injured. *It is mainly through them, too, that absorption takes place*. It is readily seen, therefore, why the careless or unskillful removal of plants from the earth, for the purpose of transplanting, by destroying the delicate points of the roots, or *spongelets*, as they are called, always checks so greatly their growth, and often destroys their life.

Their peculiar mode of growth admirably adapt roots to pierce the earth and insinuate themselves into the minutest crevices. Thus they pass on from place to place in search of fresh pasturage, shifting their mouths, although their bodies remain stationary.

Roots seem to possess a principle akin to instinct, which guides them in their search for food ; for they invariably extend themselves most rapidly and widely in the direction of the richest soil. If a strawberry plant be set in a sandy soil, deficient in nutritive matters, and rich earth placed on one side of it, the roots will immediately seek the fertile spot, although at first nowhere in contact with it. A decaying bone or a piece of rotten wood will in the same way be sought out by the roots of a plant requiring the nutritive elements it may contain ; and such objects are often found completely covered by a network of minute rootlets.

The roots of plants have, to a certain extent, the power of selecting their food. In general, they absorb only those substances which are needed to develop and perfect their various parts. Thus, if a pea and a grain of wheat be planted side by side, and made to grow under the same circumstances, the wheat plant will absorb silex (in solution) from the earth, while the pea will absorb none. This power of selection, however, does not enable the roots of plants to reject, under all circumstances, any deleterious agents which may be brought in contact with them ; and it is a curious circumstance that substances which are fatal to man are equally so to plants, and in nearly the same way.

In addition to their principal office, as feeding organs, the roots of plants are believed to be, to some extent, organs of excretion, throwing off any superfluous or deleterious matter which may have been imbibed either by themselves or by the leaves. They also possess the power of accumulating a store of sap, upon which the plant may draw in time of need. Striking examples of the last-named property are furnished by the turnip, the beet, the carrot, and other plants of the same class.

In general, roots do not produce buds, and are therefore incapable of multiplying the plant to which they belong ; but to this rule there are many exceptions, some species having the power, under certain circumstances, of forming what are

called *adventitious* buds. In such cases they may be employed for the purposes of propagation.

Roots are not inactive during the winter, as many suppose, except while actually frozen, but are perpetually extracting food from the earth, and storing it up for the next season's use. A

long, mild winter is therefore favorable to the vegetation of the succeeding spring.

Roots are of various kinds. In reference to their duration, they are classed as *annual*, *biennial*, and *perennial*. An

annual root lives but a

single year. It is always *fibrous*, or composed of numerous branches or rootlets. Biennial roots are those of plants which do not blossom till the second year, at the end of which they perish. They are thickened or *fleshy*, and of various shapes—*conical*, as in the carrot; *spindle-shaped*, as in the radish; *tur-*



FIBROUS ROOT.



SPINDLE ROOT.



TUBEROUS ROOT.



CREeping ROOT.

nip-shaped, *clustered*, *tuberous*, etc. Perennial roots are those which, like the roots of trees and woody plants, and some others, survive from year to year indefinitely.

A *tuber*, of which the potato is the best example, is not strictly a root, but a modification of the stem, running beneath

the surface of the soil, and having buds (eyes) embedded in a cellular substance, consisting principally of starch.

Bulbs, whether formed in the earth, as is generally the case, or on the summit of the stem, as in the top or tree onion, are simply leaf-buds inclosed in scales or concentric layers.

III.—THE STEM.

As soon as the root enters upon the performance of its proper function, the stem begins to extend itself upward, and the primary leaf-bud, attracting to itself the food procured for it, and a part of the nutritive matter stored up in the seed-leaves, expands, and the two or more parts or leaves of which it is composed separate, and begin to manifest their distinctive features.

The stem is at first composed entirely of cellular tissue, possessing neither strength nor tenacity; but at the moment that the first rudiment of a leaf appears upon its growing point, the formation of woody matter commences. It consists of tough fibers of extreme fineness, which take their rise in the leaves, and thence pass downward through the cellular tissue and are incorporated with the latter, giving it the necessary strength and flexibility. In trees and shrubs these fibers combine intimately with each other, and form what is properly called wood; but in herbaceous and annual plants they constitute a lax fibrous matter. The woody matter thus plunged, as it were, into the cellular tissue, forms within the circumference of the stem a tubular partition, separating it into two parts—the bark and the pith. This gives us, in perennial stems, the three general divisions of pith, wood, and bark.

The *pith* consists entirely of cellular tissue, gorged at first with the nourishing juices of the plant, but afterward becoming empty and dry.

The *wood* consists of the proper woody fiber, interwoven with and bound together by thin plates or layers of cellular tissue, passing horizontally across it, and forming what are called the *silver grain* in maple, oak, etc. They represent the

horizontal system of the wood—in botanical language, the *medullary rays*.

The *bark* consists originally of cellular tissue alone, but afterward the inner portion next the wood has the woody tissue formed in it, and becomes the *liber*, or fibrous inner bark.

Whenever a stem is wounded, it is the cellular or horizontal system which forms granulations that eventually coalesce into masses, within which the woody tissue is subsequently developed, and the communication between the two sides of an incision effected. In cuttings, the callus which forms at the end placed in the ground is the cellular or horizontal system preparing for the woody fibers, which are to pass downward in the form of roots.

The description we have given of the structure of a stem applies to all plants whose woody matter is augmented annually by *external* additions below the liber, and which are called *exogens*, or outside growers. All the trees and shrubs of the United States, except the few palms of our Southern confines, belong to this class. In the palms, which belong to the class

of *endogens*, or inside growers, the woody matter is augmented annually by *internal* additions to their center, thus constantly pushing the woody



EXOGEN.



ENDOGEN.

growth of former years to their circumference. The stem of the asparagus exhibits a similar structure in an herb. In *endogens*, the cellular and fibrous systems are all mixed together, their mode of growth not requiring the same arrangement of parts as exists in the *exogens*.

Stems, during their growth, form on their surfaces minute vital points, each of which becomes, or may become, a leaf-bud, capable of forming another stem or branch like that on which it is found. These buds appear immediately above the point of union between the leaf and the stem, and are not,

under ordinary circumstances, found anywhere else. They occasionally, however, appear on other parts, when they are called (as when found on the roots) *adventitious* buds. It is by means of the leaf-buds that a cutting is capable of producing a new individual like that from which it was taken. Leaf-buds are also capable, under fitting circumstances, of growing when separated from the parent branch. In some cases they are planted in the earth, when they put forth roots, and thereby sustain an independent existence. In others they are inserted below the bark of a kindred species, and, forming new wood, adhere to that on which they are placed.



BUDS.

The principal functions of the stem (aside from its continual multiplication of itself by means of buds) are the support of the leaves and the conveyance and distribution of the sap. In trees, the sap or crude food procured by the roots rises principally through the newer wood; but the assimilated sap returns from the leaves in the *newest* bark, or *liber*, whence it is horizontally diffused, through the *medullary rays*, into the sap-wood and other living parts. It is in the bark, therefore, and not in the wood, that we must look for the proper juices of a plant.

IV.—LEAVES.

A leaf, as defined by Dr. Lindley, is an appendage of the stem of a plant having one or more leaf-buds in its *axil*, or point of union with the stem. In some cases no leaf-buds are visible, but they are present, nevertheless, although latent, and may be developed by favorable conditions.

A complete leaf consists of the *lamina*, or blade, and the *petiole*, or leaf-stalk. In some leaves the *petiole* is wanting, the *lamina* resting immediately upon the stem, and in others there is no proper blade, the whole organ being cylindrical or stalk-like.

Considered in reference to their structure, it may be said

leaves are extensions of the green layer of the bark (which, where no proper leaves exist, fulfills their function) expanded into thin lamina and strengthened by woody fibers connected with the *liber*, or inner bark, and with the wood. These woody fibers form their frame-work, and afford, at the same time, by their microscopic ramifications, a complete and beautiful system of veins. The leaf, therefore, like the stem, consists of two distinct parts, the cellular and the woody. The cellular portion is not the structureless, pulpy mass which it appears to be to the naked eye, but presents a regular and beautiful arrangement of cells. The woody part forming the veins, and having, as we have seen, a double origin, is arranged in two layers; the upper, arising from the wood, and conveying the ascending sap to every part of the leaf, and the lower, connected with the *liber*, and establishing a communication with the bark, by means of which the assimilated juices pass downward. Encasing the whole of this wonderfully beautiful apparatus is the *epidermis*, or skin, pierced by numerous invisible *pores* or holes, called *stomates*, through which the plant breathes and perspires.

It would be interesting, in connection with the foregoing brief outline of the structure of the leaf, to give some account of the different forms of leaves, their various modifications, and their systematic and beautiful arrangement on the stem; but as the practical ends we have in view do not require us to pursue the subject further in this direction, we must forego it.

Leaves have been called the lungs of plants. They are something more than this, being not only organs of respiration, but of perspiration and digestion also. They are, at the same time, stomach, lungs, and skin. They receive the crude sap from the roots through the stem, and, by means of exposure to air and light, the decomposition of water and carbonic acid, and the throwing off of superfluous moisture, condense it and change it into organizable matter—the true food of plants. This elaborated sap is sent immediately downward, to serve for the nourishment of every part.

The nutrition of a plant depending upon its leaves, the former may be destroyed by simply destroying its foliage. In general, it does not immediately die, because it has the power of putting forth new leaves, which come into action and supply imperfectly the places of those removed; but if it be deprived of these essential organs during the entire season, its power of producing them ceases, and all functions are suspended.

V.—FLOWERS AND FRUIT.

A flower is that part of a plant which is formed for the purpose of reproducing its species by means of seeds. Fruit is the seed, or the seed and its *pericarp*, or covering. The *pericarp* includes whatever goes to make up the seed-vessel, whether it be a mere thin husk, a hard, bone-like shell, or a soft, fleshy pulp.

Anatomically considered, the parts of a flower are merely modified leaves, the whole forming a very short branch. What causes a plant to convert some of its leaf-buds into flowers, by fashioning the leaves into *calyx*, *corolla*, *stamens*, and *pistils*, while other buds become ordinary branches, it is not essential to our purpose to explain. It is pretty clear, however, that *their production depends upon the presence in the plant of a sufficient quantity of secreted matter, fit for their maintenance when produced*. If it happen, then, that, from any cause, there be not, at the usual time of flowering, any store of nutritive juices beyond what is required for the production of leaves and the growth of the stem, no flower-buds are put forth. This is illustrated in the failure of fruit-trees to bear at all the season next succeeding one in which an excessive crop has been produced.* Sometimes flowers are produced, but, the supply of nutriment proving insufficient, they drop off without producing fruit.

Lindley syllogistically says: "A flower being a kind of branch, as has been already shown, and the fruit being an ad-

* See Appendix, A.

vanced stage of the flower, it follows that a fruit is also a kind of branch." It has certainly the same organic connection with the plant as other branches, and, like them, requires to be supplied with food, without which it must perish.

So long as a fruit retains its original green, foliaceous character, it is capable of performing, partially at least, the functions of a leaf, decomposing carbonic acid, etc. A portion of the food required for its maturation may therefore be derived, by its own action, from the air; but the greater part must be prepared by the leaves from material furnished by the roots. This shows the necessity of the healthy and regular action of the leaves and roots in perfecting fruit, and the importance of fruit being placed near the leaves, so that it can readily attract the required nutriment from them. If you remove all the leaves from a branch containing fruit, you stop the growth of the latter almost as effectually as by separating it from the stem.

The juices furnished by the leaves undergo further alterations by the vital forces of the fruit itself, and this alteration varies according to the species. The fruit of the peach is sweet, but there is no perceptible sweetness in its leaves; and the fruit of the fig is sweet and nutritious, while the leaves of that plant are acrid and deleterious.

Among the principal immediate causes of the changes which occur in the secretions of fruits are heat and light. Fruits produced in warm seasons are always much sweeter than those which are matured in cold ones; and the products of hot climates abound in sugar, while in those of cold climates acidity prevails.

The ripening of fruit is hastened by dryness, and retarded by an excess of moisture.

Seeds are affected by all the circumstances which affect the fruit, which is created primarily for their nutrition and preservation. The fruit attracts organizable matter from the leaves, and the seeds attract it from the fruit. The better the fruit, therefore, the more perfect are the seeds.

All seeds will not equally produce vigorous plants; but the healthiness of the seedling will correspond with that of the seed from which it sprung. Where vigor is required, the plumpest and heaviest seeds should be selected.

A seed always produces a plant of the same species as that from which it was derived, but is not certain to reproduce any peculiarity that may have existed in its parent. For instance, the seed of a Green Gage plum will grow into a new individual of the plum species, but it is not certain, or even likely, to produce the variety known as the Green Gage. The variety must be propagated in some other way.

VI.—THE FOOD OF PLANTS.

The gardener should know precisely what substances plants require for their growth and the maturation of their fruit—that is, their natural food. This is ascertained by analysis. When we have learned of what plants are composed, we know what their food must necessarily contain.

The constituents of plants, as shown by analysis, are of two kinds, organic and inorganic. Only the organic constituents, however, are universally indispensable. These are oxygen, hydrogen, nitrogen, and carbon, which make up at least from eighty-eight to ninety-nine per cent. of every vegetable substance. The inorganic constituents, which are essential to the perfection of any but the lowest grade of plants, consist mainly of potash, soda, lime, magnesia, alumina, silex, sulphur, and phosphorus.

Now, where and how are the different kinds of food which plants require obtained? Mainly, no doubt, from the soil, and by means of the roots, which, we have seen, are the proper feeding organs. The air may, however (and evidently does, in some cases, as in the *epiphytes*, or air-plants), either directly or indirectly, supply all the organic elements.

But whether derived from the earth or from the air, *the plant's nourishment is wholly received either in the gaseous or the liquid form*; for the leaves can imbibe air or vapor only

while the tissue of the rootlets is especially adapted to absorb liquids, and *is incapable of taking in solid matter, however minutely divided*. Let these facts be borne in mind while preparing your soils and manures.

The oxygen and hydrogen required by plants is probably derived principally from water.

The nitrogen is obtained mostly by the decomposition of ammonia (hartshorn), a compound of hydrogen and nitrogen, always produced when any animal and almost any vegetable substance decays. It is dissolved in water, absorbed by porous substances in the soil, and thus furnished to the roots of plants.

The source of the carbon, which forms much the larger portion of the bulk of plants, is still to be sought. Carbon itself is a solid, absolutely insoluble in water, and therefore not available. The chief, if not the only fluid composed of carbon, naturally presented to the plant, is that of carbonic acid gas, which consists of carbon united with oxygen. This gas makes up, on the average, one two-thousandth of the atmosphere, from which it may be directly absorbed by the leaves; but, being freely soluble in water, up to a certain point, it must be carried down by the rain and imbibed by the roots. The carbonic acid of the atmosphere is, therefore, the great source of carbon for vegetation. Carbonic acid is also produced in small quantities by the action of manures in the soil.

The carbonic acid absorbed is decomposed in the leaves by the action of solar light; the carbon being retained and the oxygen thrown off—beautifully reversing the process of animal respiration, and thus preserving the proper balance in the atmosphere.

The mineral matters which form the inorganic constituents of plants are all either soluble in water, or in the acids or alkalis mixed with it, and are therefore readily absorbed by the roots,

The following analysis of wheat will give the reader an idea of the principal mineral constituents of plants generally, as to the number of their elements; their proportion will vary

greatly in different species. The wheat (the entire plant, including the seed) in 1,000 lbs. gave 11½ lbs. of ashes, composed as follows:

Potash.....	2.25	Silica.....	4.00
Soda.....	2.40	Sulphuric acid.....	.50
Lime.....	.96	Phosphoric acid.....	.40
Magnesia.....	.90	Chlorine.....	.10
Alumina.....	.26	Iron, a trace.	

An analysis of perfected plants of the same species, although growing in very different soils, will give the same proportion; while different species, although growing in the same soil, will give very different proportions, showing that plants require definite quantities of the inorganic elements in order to perfect growth, and that in soil that does not yield these elements an imperfect growth only can be obtained.

These facts lie at the foundation of rotation of crops and manuring. When any given plant has exhausted the soil of the soluble elements requisite for its growth, another plant requiring different elements, or the same in different proportions, may grow luxuriantly and in perfection in the same soil. Generally the *grasses*, such as wheat, rye, oats, etc., require large quantities of silica; peas, clover, and tobacco, much lime; turnips, beets, and sweet potatoes, potash and soda. The stalk and fruit often require different elements in different proportions. Both of course must be supplied. These elements might exist in the soil, but not in a soluble condition, and of course yield no benefit to the plant.*

VII.—CONDITIONS ESSENTIAL TO GROWTH.

All the conditions essential to growth have already been either specially explained or incidentally mentioned; but it may be useful briefly to recapitulate:

1. *Warmth*.—Without this, as we have seen, the latent powers of vegetable life can not be called into action. It is

* See Appendix, B, and also "The Farm," for more on this point.

not less essential to their continued activity. Although many plants will live at a temperature much below the freezing-point, yet no plant is able to *grow* unless the temperature is above 32°, for physical reasons which require no explanation. A temperature permanently much higher than a plant requires for its healthy growth over-excites, enfeebles, and finally destroys it.

2. *Moisture*.—Moisture is obviously essential, both because water itself in its pure state furnishes two of the essential elements which enter into the composition of all plants, and because it constitutes the medium through which the other substances required are conveyed into the roots. Excessive moisture, however, is destructive to most plants. It is a great point in horticulture to determine the degree of moisture most congenial to a given species, under given circumstances. As a general rule, *the plant should be most abundantly supplied with moisture when it begins to grow, and the quantity gradually diminished as it approaches maturity*. However, as one effect of excessive moisture is to keep the newly-formed parts of a plant tender and succulent, those the leaves or roots of which (as in the case of lettuce, radishes, etc.) are to be eaten uncooked, should be constantly supplied with moisture. Excess of moisture will also cause strawberries and other fruits to swell beyond their natural size; but their flavor is diminished in the same proportion.

3. *Food*.—A plant can no more live without food than a human being can. Deficiency of food dwarfs it, and prevents perfect development; and it must not be forgotten that *the presence in the soil of the nutritive elements is of no avail so long as they remain in an insoluble condition*. It is only in a gaseous or liquid form (allow us to repeat) that plants are capable of receiving their food.

4. *Air*.—Plants breathe (in their way), and must therefore have air. Much of their nourishment is derived either immediately or remotely from it.

5. *Light*.—It is by the aid of solar light alone that the leaves can properly perform their grand function—the assimilation of

the crude sap furnished them by the roots. It is only under the influence of light that they decompose the carbonic acid gas from which the large proportion of carbon they require is obtained. It is to light also that they owe their green color. In the dark this coloring matter is not formed, potatoes and other vegetables kept in cellars throwing out white stems and leaves. Some plants, however, require less light than others, and flourish in shady places. When we wish to blanch a plant, as in the case of celery, we exclude the light.*

* For a further elucidation of the various subjects discussed in the foregoing pages, see Lindley's "Theory of Horticulture," Gray's "Botanical Text-Book," Boussingault's "*Economie Rurale*," and Darby's "Botany of the Southern States," to all of which, and especially to the first-named, we have been indebted in the preparation of this chapter.

II.

SOILS AND MANURES.

The soil should be good to the depth of two feet, and any necessary deepening beyond this, by manures or otherwise, should not be neglected.—*Neill*.

I.—CLASSIFICATION OF SOILS.



We are accustomed to recognize three primitive earths—silex (which includes sand and gravel), clay, and lime. These, together with decayed vegetable and animal matter, enter more or less into the composition of all soils. On the relative proportion of these ingredients and their texture, or degree of fineness or coarseness, depends mainly the character of each variety.

Soils may first be considered in two grand divisions—heavy and light, the former being characterized by a predominance of clay, and the latter by an excess of sand or gravel.

1. *Heavy Soils*.—The heavy or clayey soils are also known as wet and cold, from their strong affinity for water. In dry weather, however, they are liable to bake, or become hard and brick-like. They are difficult to work, and, till much modified by art and labor, generally unproductive.

2. *Light Soils*.—The light or sandy and gravelly soils are denominated dry and warm, because they permit the water to pass readily through them. They are subject to drouth, and have the further disadvantage of allowing a large proportion of the manure applied to them to pass through into the sub-soil. They are easy to work, and crops can be brought to perfection much earlier on them than on clayey soils.

These grand classes of soils, running into each other by imperceptible gradations, and being variously modified, may be considered as embracing every variety found on the face of the globe.

3. *Loamy Soils*.—A mixture of from fifteen to sixty per cent. of sand with clay forms a loamy soil. If the sand do not exceed thirty per cent., it is called a clay loam; more than thirty per cent. constitutes it a sandy loam.

4. *Calcareous Soils*.—Calcareous soils are those in which lime, exceeding twenty per cent., becomes the distinguishing constituent. Calcareous soils may be either calcareous clays, calcareous sands, or calcareous loams, according to the proportions of sand or clay which may be present in them.

5. *Marly Soils*.—Soils containing lime, but in which the proportion does not exceed twenty per cent., are sometimes called marly.

6. *Vegetable Molds*.—When decayed vegetable matter exists in so great proportion as to give the predominant character to a soil, it receives the name of vegetable mold. Vegetable molds are of various kinds, and may be either clayey, sandy, or loamy, according to the predominant character of the earthy admixtures.

7. *Alluvial Soils*.—Alluvial soils are such as have been formed by the washings of streams. They are generally loamy, and very fertile.

Besides their principal component parts, every soil must contain, in greater or less quantities, all the elements which enter into the composition of vegetables. They may have certain substances which are not necessary to vegetable life, and such as are necessary may be in excess; yet to sustain a healthy, prolific vegetation, they must hold, and in a form fitted to its support, *silex*, *alumina*, *carbonate of lime*, *sulphate of lime*, *potash*, *soda*, *magnesia*, *sulphur*, *phosphorus*, *oxyd of iron*, *manganese*, *chlorine*, and probably *iodine*. These are called the inorganic or earthy parts of soils. In addition to these, fertile soils must contain *carbon*, *oxygen*, *nitrogen*, and *hydro-*

gen, which are called organic parts of soils, from their great preponderance in vegetables and animals.

For gardening purposes, a loamy soil, composed of nearly equal proportions of clay, sand, and lime, and enriched by deposits of decayed animal and vegetable matter, is perhaps the best; but a sandy loam similarly enriched is good. Very heavy and very light soils are objectionable; but the latter less so, since it may be much more easily improved.

Subsoils.—The productiveness of a soil depends to a considerable extent upon the subsoil or bed on which it rests, which may be either clayey, sandy, gravelly, or calcareous. A clayey subsoil is unfavorable, as it renders the soil wet and cold. Loose and leachy subsoils, consisting mainly of gravel or sand, are also undesirable, on account of the facility with which moisture and the soluble portions of manures escape into them. Calcareous subsoils are considered best.

II.—IMPROVEMENT OF SOILS.

As the original soil of one's garden can not always be a matter of choice, the garden being properly situated near the house, and the house depending for its location upon other circumstances besides the soil, it becomes important to know how to improve it if it happen to be of an undesirable character.

In order to set yourself about the work of improvement with a reasonable prospect of success, you should have a clear comprehension of the end to be attained. What, then, are the qualities desirable in a garden soil?

A garden soil should be loamy, rich in all the elements essential to the growth of plants, sufficiently light and friable to be easily cultivated, and to allow the roots to penetrate it in every direction, and at the same time sufficiently adhesive to retain moisture and the soluble portions of manures till they may be required by the growing plant.

Improvement of Clayey Soils.—If it be a clayey soil with which you have to do, you will probably, in the first place, find it too wet. The only effectual remedy for this defect is

thorough underdraining. This not only draws off the surplus water, but opens the soil to the action of the atmosphere, which, in its passage through it, imparts its nutritive gases, and helps to warm and disintegrate it. Deep trenching will aid in the process of draining.*

Having thoroughly drained your plot, you should next give your attention to improving the texture of the soil in other ways. The natural remedy for their too dense and adhesive character seems to be sand; but to produce the desired effect large quantities are required—so large that the improvement in that way of large tracts of land is considered impracticable. In treating a small garden, however, the expense of the application may often be disregarded.

Lime is a valuable auxiliary in the improvement of clayey soils, forming, with their ingredients, chemical combinations, whereby their extreme tenacity is broken up, and adding, at the same time, an element of fertility, in which they may be deficient. Gypsum, or plaster of Paris, has the same effect in a still more powerful degree. Ashes, coarse vegetable manures, straw, corn-stalks, leaves, chips, etc., are also very useful, as they add new materials, and also help to separate the particles of the original soil.

In cold climates, clayey soils should be plowed or dug in the fall, the action of the frost and snow tending to break them up and destroy the adhesion of their particles. In the South, where there is little frost, and frequent and copious rains occur during the winter, this course is injurious rather than beneficial.

The frequent working of clayey soils with plow, harrow, spade, or hoe, if done when they are not too wet, will greatly improve them.

A persevering application of the various means we have indicated, will gradually bring the heaviest clay soil into the proper loamy consistency for horticultural purposes.

A loamy soil resting upon a clayey subsoil should in general

* For a chapter on Draining, see "The Farm."

be underdrained; but if the stratum of clay be shallow, trenching or subsoil plowing will answer a good purpose.

Improvement of Sandy Soils.—If your plot be sandy, its improvement, though equally necessary, is less difficult. The defects of sandy soils, as we have seen, are lack of adhesiveness, want of affinity for water, and a leachy character, which permits the escape of manures. Clay is the principal remedy indicated, and a few loads, well incorporated with the original soil, will have an astonishing effect in improving a sandy garden. The required tenacity is thus very readily imparted.

Lime is scarcely less valuable for application to sandy than to clayey soils; for while it separates the latter, it renders the former more adhesive. Gypsum, ashes, and clay marls are also exceedingly useful. To these applications should be added the frequent use of a heavy roller.

Where a sandy soil rests upon a clayey subsoil, as is not unfrequently the case, it may be greatly improved by trenching or deep plowing, by means of which a portion of the subsoil is thrown up and mixed with the surface soil.

Sandy soils, modified as we have indicated, being warm, quick, and easy of cultivation, are the best in the world for tap-rooted plants and bulbs, and for the production of early crops of almost every kind.

Gravelly soils resemble sandy soils in their characteristic defects, and require similar treatment; but they are less desirable, and require greater modifications to adapt them to gardening purposes.

The other soils named require similar treatment in proportion as they approach the clayey or sandy character.

Depth of Soil.—The soil of most gardens (except on the alluvial bottoms of the West) requires improvement in depth quite as much as in any other particular. In no part of your garden should you be satisfied with less than *two feet* of good, friable soil, easily permeable by the roots of plants. A still greater depth is desirable, especially in the fruit department. Few who have not had their attention specially drawn to the

subject are aware how deeply the roots of some species of plants penetrate, when permitted by a proper state of the soil. The roots of a strawberry plant are said to have been traced *five feet* in a deep, rich soil.

Trenching and subsoil plowing are the processes by which the depth of soil is increased. The former is an expensive process, but, in gardening, a remunerative one; the latter is much cheaper, and, where it can be applied, serves a good purpose.

Trenching, or subsoil plowing, is positively essential where the summers are long and dry, as in portions of the Southern States. Mr. White, in his "Gardening for the South," says very truly that there is no point of greater importance than this. "Poor ground, deeply moved," he adds, "is better than rich land with shallow tillage; and when the ground has been once prepared in this way, it will feel the benefit forever after. Increasing the depth of the soil in this mode is, to all intents and purposes, increasing the size of your garden; for one fourth of an acre thus prepared will yield, in a dry season, as much as an acre will with shallow tillage, and the growth of plants in good seasons will be fully doubled."

Trenching should be performed in the fall, and any coarse manures you may wish to apply dug in at the time. For a description of the process of trenching, see Chapter III.

Color of Soils.—The color of a soil has an important relation to its capacity for heat and moisture, and consequently to its adaptedness for horticultural purposes. Dark-colored earths, all other things being equal, are the best.

Old Gardens.—Some old and small gardens are in a very bad state from excess of nutritive matters, or rather from the unavailable state in which these matters exist in the soil, which, instead of consisting of friable mold, presents only a black, shining substance, known to chemists as humic acid. This is the product of manures saturated with stagnant water, and is the result of excessive manuring, frequent watering, and lack of drainage. No condition can be more unfavorable to the

growth of plants than this, and if they grow at all in such soil they will be gross, pungent, and unwholesome. The remedy is trenching, underdraining, and the application of lime, gypsum, ashes, etc.

Further means of improving soils will be treated of in the next section, under the head of Manures.

III.—MANURES.

If your soil be either wholly or partially deficient in any of the constituents of plants, these constituents must be supplied by adding to it substances which contain them. The substances thus added are called manures, which, in the broadest sense of the word, embrace everything which, being added to the soil, promotes directly or indirectly the growth of plants.

Manures directly assist the growth of plants either by entering into their composition, or by absorbing moisture and nutritive gases from the atmosphere, and holding them for their use. Indirectly, manures assist the growth of plants by destroying vermin or weeds, by decomposing the soil and rendering its elements available, by protecting vegetation from sudden changes of temperature, or by improving the texture of the soil. They are divided into two classes—organic and inorganic. The former embraces ordinary vegetable and animal substances, and the latter mineral substances.

Organic Manures.—The principal organic manures are the dung of animals, human excrements, urine, flesh, blood, fish, swamp-muck, sea-weed, and decayed leaves, hay, straw, and wood. Guano, though an animal product, contains so large a proportion of salts, and is so deficient in the characteristics of recent animal matter that it is generally classed with the inorganic manures.

Inorganic Manures.—The principal inorganic manures are ashes, lime, the marls, gypsum, bones, salt, charcoal, soot, and guano.

Theory of Manures.—The kind of manure which will prove most useful in a given instance must be determined by refer-

ence to several circumstances—the chemical composition and mechanical texture of the soil, the character of the climate or season, and the kind of crop to be produced. The manures most generally applicable are those composed of substances which directly enter into and are essential to the growth of plants.

The fertility of a forest is not only maintained but increased by the constant decay of its leaves, branches, and trunks, which returns to the earth not only the nutritive matter originally drawn from it, but also much that has been supplied by the atmosphere. This manure is just what the trees need—it keeps good the supply of the elements essential to their growth. So the parts of any plant decayed and rendered soluble are the best manure for its species. But the products of our gardens are mainly taken from them, and used as food. Every particle not thus made use of should be returned, mixed with other vegetable and animal matter, in the form of compost. For the rest, stable manures (of which the dung of the horse is the best) should be relied on as the grand staples.

All the ordinarily cultivated plants, as has already been stated, contain potash, soda, lime, magnesia, alumina, silica, iron, sulphur, phosphorus, chlorine, carbon, oxygen, nitrogen, and hydrogen. The four substances last named may, as we have seen, be derived either immediately or remotely from the air; but they are all essentials of a fertile soil, and, to perpetuate its fertility under cultivation, must be supplied in the form of manures.

Stable Manure.—Common stable manure contains potash, soda, lime, magnesia, alumina, silica, oxyd of iron, sulphur, phosphorus, chlorine, carbon, oxygen, nitrogen, and hydrogen. Lime exists both as a carbonate and as a phosphate, potash as a muriate and a sulphate, and soda as a carbonate. A comparison of this list of chemical substances with those enumerated in the preceding paragraph as the essentials of a fertile soil, will at once show the value of stable manure. Every part of it has been formed from vegetable substances, and it has only

to be rendered friable and soluble to enter again into their composition. As plants can not, it will be remembered, absorb manures in a gross or solid form, the last point is an important one, and of universal application.

Night Soil.—Human excrements, composted with charcoal-dust, ashes, turf, loam, etc., form a most powerful fertilizer. Quicklime should never be mixed with night-soil, for while it neutralizes the odor, it also expels its fertilizing qualities.

The Dung of Fowls.—The dung of fowls contains the essential qualities of guano, and is next to night-soil in value. It should be kept dry, or else mixed at once with a compost which will retain all the volatile and soluble matters which it contains.

Other Organic Manures.—Dead animals, blood, butchers' offal, fish, hair, bristles, hay, straw, leaves, sea-weed muck, rich turf, the refuse from the kitchen, and the slops from the chamber are all of great value as materials for a compost.

Ashes.—If any dried vegetable product be burned, the combustible substance remaining behind is called the ash or ashes. This, though generally less than one tenth of its substance, is all that the plant necessarily derived from the soil. The substances expelled are carbon, oxygen, nitrogen, and hydrogen. They return to the air, from which they were either immediately or remotely derived. The ashes of vegetables, then, furnish just the inorganic elements required for their growth. Their value as a manure is evident, and it is astonishing that any person with a garden or a farm can allow a spoonful of them to be wasted. Leached ashes contain all the elements of the unleached, but are somewhat less valuable from having lost a portion of their potash and soda. Coal ashes, though inferior to wood ashes, are still very valuable as manure.

Lime.—We have already spoken of the value of lime in improving the texture of soils. It also condenses and retains the volatile gases brought in contact with it by the air and rains, and converts the insoluble matters of the soil into available food for plants, besides entering itself directly into the composition of nearly all vegetation.

The Marls.—Marls are composed of carbonate of lime mixed with clay, sand, loam, and frequently with phosphate and sulphate of lime and potash, and are valuable as manures in proportion to the lime and potash they contain.

Guano.—This substance is composed of the dung, food, and carcasses of sea-birds which have been accumulating for ages on some of the islands of the Pacific and Atlantic oceans. Of its value as a manure there can be no doubt. There is much fraud in its sale, however, and if great caution be not exercised, an adulterated article may be palmed off upon you. It must never, in a fresh state, come in direct contact with the seeds or roots of plants, as it is certain to destroy their vitality.

Other Inorganic Manures.—Common salt is valuable in small quantities for garden use. On account of its great affinity for water, it attracts the dews and atmospheric vapors, and is therefore a preventive of drouth. It is also useful in destroying worms, slugs, and larvæ. Old plaster, broken bricks, bones, charcoal, soot, and even broken glass, are useful as manures, and should be carefully saved and applied.

Having said so much of the various manures, we must repeat, in order to impress it upon the reader's mind, that our principal reliance should be upon stable manure (with which we would include that from the pig-sty) and the composts formed of home-made materials, according to directions we are about to give. The special manures most likely to be required by soils in general are lime, phosphate of lime, and potash.

Composts.—In or near the garden, and in some out-of-sight corner, there should be at all times a compost heap for receiving all kinds of rubbish that can have the least value as manure.

Make a shallow excavation of sufficient size, and a little lower at one end than at the other, forming with the earth thrown out a small embankment all around it. Into this throw green weeds, the sweepings of the yard, the refuse of vegetables, leaves, decayed vegetable matter of all kinds, woolen rags, old plaster, charcoal-dust, soot, soap-suds, brine, slops from the kitchen and chambers, etc. The heap should be dug over occa-

sionally, adding a little ashes and lime. Animal manures should be composted in a separate heap, to which ashes and lime should not be added, as they would do harm by setting free the ammonia. In the latter case, charcoal-dust, plaster of Paris, and vegetable mold, leaves, turf, or swamp-muck should be used.

One who has never tried the experiment of carefully husbanding the elements of fertility which accumulate about a house, yard, and garden will be astonished at the annual amount and value of the compost which may, with very little trouble, be thus manufactured. Try it.*

* For a more complete exposition of the whole subject of Soils and Manures, see "The Farm."

III.

FORMATION OF A GARDEN.

Nothing conduces more to the successful completion of any piece of work than a good beginning.—*A. Nonne.*

I.—SITUATION.



It is desirable, if not absolutely necessary, that the garden should be placed near the house, the situation of which must be determined, in part, at least, by independent considerations, our range for the selection of a plot is generally quite limited. But it is well to know what kind of a situation is best, that we may exercise understandingly any liberty of choice that may be allowed us.

For early crops a southeastern exposure, with a slight inclination, is best, as it receives the full benefit of the morning sun. If sheltered on the north and northwest by higher grounds or by trees or high walls, so much the better. In warm climates, however, a northwestern exposure is better for many garden crops.

In selecting a situation for a garden, reference should also be had to soil. If this be originally good, the expense of making it so, artificially, will be saved, and only ordinary manuring required. Diversity of soils and exposures are also desirable combinations of advantages. Proximity to water is important, but very low grounds are, if possible, to be avoided.

II.—SIZE AND SHAPE.

The size of a garden will naturally depend mainly upon the wants, tastes, and means of its owner. An acre is not too much, but one half or even one fourth of an acre, well ma-

nured and skillfully cultivated, will furnish vegetables and fruits sufficient for the use of a small family. If you can consistently appropriate an acre or more for the purpose of a garden, do not be content with less. You will find a ready market for its surplus products, and at high prices, too, unless you happen to be situated at a great distance from any city or large town.

The form of a garden, like its situation and size, must depend upon circumstances. For convenience in laying out and cultivation, a square or a parallelogram is a good shape. If the form be a parallelogram, it is better that it should extend from east to west than from north to south.

III.—LAYING OUT.

The fruit and kitchen garden are to be looked upon from an economical rather than an esthetic point of view, and their internal arrangement should be simple, and, so far as circumstances will permit, regular and geometrical. In laying out a flower-garden or a lawn, however, no matter how small it may be, there is room for the exercise of taste and the creation of beauty; and we will reserve our directions on that point for the chapters devoted specially to those topics, confining ourselves here to the fruit and kitchen departments.

Whether within the same inclosure or not, the flower-garden will naturally be placed nearest the house. Passing through that, we enter the kitchen department, beyond which is the fruit-garden. It is better, however, in some cases to reverse the order of the last two, placing the fruit department next the flower-garden. In small gardens, too, these departments necessarily intermingle to some extent; but this should be avoided so far as is possible, as the trees are very detrimental to other crops—shading the ground, injuring tender plants by the drippings from their branches, and exhausting the soil by means of the heavy drafts made upon it by their roots. Dwarf pears may be admitted into the vegetable department with comparative impunity, provided the soil is sufficiently manured to withstand the double demand thus made upon it.

A large garden should have a walk through the center, extending the whole length, with a turning place at the extremity, and broad enough to admit a cart for bringing in the manure and conveying the heavier crops to the cellar or other place of storage. This walk may be crossed by another at right angles, and both should be bordered with currant or gooseberry bushes, or other shrubs. In small gardens these walks may be narrow and without borders, or may be omitted altogether. A border from four to twelve feet wide, and skirted by a walk three or four feet wide, should run entirely around the garden. The smaller compartments need not be separated by permanent walks, and their arrangement must be left to be decided by the circumstances of each case.

The only general direction that seems necessary in reference to laying out the fruit department is, that care should be taken to give the less hardy trees the most sheltered and warmest position, and to so dispose the various kinds that the larger trees shall not shade and dwarf the smaller. The fruit-garden should have its wall-borders for the cultivation of raspberries, blackberries, currants, gooseberries, etc. (unless these, as is generally the case in small gardens, are transferred to the borders of the kitchen department), and its trellises and arbors for grapevines.

IV.—FENCING.

A garden should be surrounded by a close fence, at least seven feet high, and picketed, to prevent the entrance of thieves. The height and closeness of the fence will increase the warmth of the air, break the force of high winds, which might injure tender plants and trees, and prevent, in a measure, the seeds of weeds from being driven into it by the wind. A close board fence, however, is an unsightly object, and a high close hedge, so soon as it can be grown, may advantageously take its place. The Osage Orange and, at the South, the Cherokee and single-white Macartney roses are suitable for this purpose.

V.—PREPARATION OF THE SOIL.

1. *Draining*.—If your soil require draining, this is the first thing to be attended to. If in digging a hole two feet deep, water be found to collect and stand in it, even during the wettest times, you may be sure that draining is required. “No one,” J. J. Thomas says, “who has never given draining a full and fair trial can appreciate its importance. Very often the soil may be worked and planted from two to four weeks earlier in the spring—a most important advantage for early vegetables. Scarcely less is the benefit during the rest of the season in preventing hard-baked soil in times of drouth.” Do not neglect this on account of the expense. No operation in gardening “pays” better. A quarter of an acre well underdrained will be more valuable than an acre of wet, cold, tenacious, undrained soil. Dig parallel ditches from twenty-five to thirty feet apart, and from three to four feet deep, forming a slightly inclined plane on the bottom, which may be from six inches to a foot wide. These ditches may be filled to a sufficient depth with rubble-stones or brush, and then covered with soil, if the arched tiles or tubes of burned clay, now mostly used, can not be procured. The average expense of the best underdraining is estimated at only from twelve to eighteen dollars an acre.

2. *Trenching*.—We have already (in Chapter II.) spoken of the necessity of depth of soil for horticultural purposes, and especially for the growth of trees, and of the means for deepening soils naturally too shallow, as nearly all are. Trenching is thus performed:

“At one end of the plot to be trenched, dig with the spade a trench three feet wide and at least two feet deep, throwing the earth out on the side opposite to the plot. Now open another trench of the same width, and put the surface spadeful of this into the bottom of the former trench, and the next spadeful upon that, until it is opened to the depth of the first one. When the plot is entirely trenched in this way, the last trench will remain open, and must be filled with the earth

thrown out from the first one. If the subsoil be poor and gravelly, it is better to take off the first spadeful, and then loosen the bottom to the required depth without bringing it to the surface. If the soil require it, as it generally will, layers of manure may be added to those of earth alternately."

3. *Subsoil Plowing*.—The expense of trenching being great, where the plot to be prepared is large, subsoil plowing may be substituted, similar results in a somewhat inferior degree being obtained. In subsoiling, a common turning plow goes first, and the subsoil plow follows, loosening the earth to the required depth below the bottom of the ordinary furrow, but not turning it up.

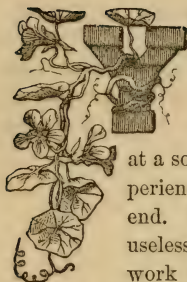
The foregoing preparatory operations being thoroughly performed, we may consider the garden ready for the ordinary processes of cultivation. Of these we shall speak in another chapter.

IV.

IMPLEMENTS AND FIXTURES.

Next to knowledge and skill are good tools.—*The Workman.*

I.—IMPLEMENTS.



YOU should supply yourself with good implements of the various kinds essential to the proper performance of every necessary operation. To purchase those of an inferior quality because they can be procured at a somewhat lower price is false economy. Experience will prove them the more costly in the end. They soon get out of repair and become useless; besides, in their best estate, much less work can be accomplished with them, and that imperfectly.

The Spade.—It is convenient to have several spades of different sizes, but a No. 2 of Ames' cast steel will serve for most purposes. For the flower-garden, a lady needs a smaller and lighter one, manufactured especially for feminine use.

The Shovel.—A shovel is necessary for loading and spreading composts and for various other operations. The round-pointed ones are perhaps more generally useful in a garden than the square-bladed.

Hoes.—You need several hoes, of different sizes and shapes. The common square draw-hoes are most used. They are of various sizes. One of three or four and another of six or seven inches will be found most useful. To these it is desirable to add a pronged hoe, a thrust-hoe, and a triangular draw-hoe. The latter is useful for digging furrows for seeds.

Rakes.—The garden rake should be of the best wrought

iron, with teeth about two and a half inches long and one and a half inches apart. The handle should be from six to eight feet long. Drill-rakes, which are very useful, if not indispensable, are made of wood, with obtusely-pointed teeth, three or four in number, placed at a greater or less distance apart, for sowing different seeds. In using the drill-rake a line is stretched to guide it in making the first drill, and afterward the first tooth is kept in the drill last made, as a guide, and thus all the rows in a long bed can be made perfectly parallel. Several different sizes are required.

The Trowel.—The trowel is very useful for removing plants, with balls of earth for transplanting. It should be from five to nine inches long, exclusive of the handle.

The Dibber.—This is a short piece of round wood, obtusely pointed. A serviceable one may be made from an old spade or shovel handle.

The Reel and Line.—These are essential—at least the line, which may be used without the reel—where anything like straight rows and regularity are desired. The reel may be either of wood or of iron.

The Watering Pot.—One holding four gallons is the best size. It should be made of double tin, and kept well painted.

Garden Shears.—These are of various sizes, and are used for clipping hedges and many other purposes. The seven and nine-inch sizes are most convenient. There is a smaller article made expressly for the ladies.

The Saw.—The pruning saw is from fourteen to eighteen inches long, and is made with fine teeth and a hooked handle, for hanging on the limb of a tree.

Knives.—A pruning knife of moderate size and a budding knife will be essential in the fruit-garden.

Hand-Glasses.—Hand-glasses, either made of panes set in boxes, or bell-glasses, are necessary for protecting early plants of the tomato, egg-plant, etc.

Ladders.—A light, common ladder and a standing ladder will be found indispensable in the fruit department.

The Wheelbarrow.—The wheelbarrow is exceedingly useful in the smallest garden, and in a large one absolutely indispensable. It should be light, but strongly made.

Additional.—Several other implements are desirable, and in particular cases indispensable, among which are, *a crowbar, a pick, a manure fork, a garden roller, a lawn scythe, a hedge hook, vine scissors, a hand-cultivator, vine shields, an orchardist's hook, a hand-syringe, etc.*

The plow, subsoil plow, and cultivator belong rather to the farm, and if you cultivate only a small garden, you will find it more economical to pay for the occasional use of these implements than to invest money in their purchase.

Preservation of Implements.—Having procured implements of a good quality, do not allow them to be destroyed for the lack of a little care on your part. An implement that in the hands of a careful and economical gardener will last and continue serviceable for ten years may be ruined in a single season by a negligent and wasteful one.

In or near the garden should be a tool-house or a room set apart for the purpose of storing the implements when not in use. Carefully clean your spades, hoes, and other implements of steel or iron, before returning them to their place. Implements of wood should be painted.

II.—FIXTURES, ETC.

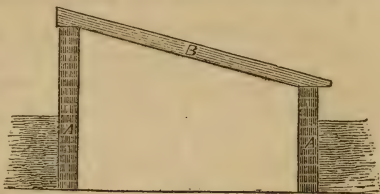
The gardens and grounds of every rural residence of taste should have seats, arbors, and other structures of rustic work—that is, work made of the trunks and branches of trees, with their bark on and in their natural forms. They may be cheaply erected, and will add greatly to the out-of-door attractions. The tool-house we have recommended may be of this character, and be made ornamental as well as useful.*

Pits.—What is called a *sunk pit* is made by excavating the earth and forming walls of brick, stone, or boards. These are

* See "The House," for designs and descriptions.

sometimes covered with glass frames, and at other times with mats or boards. They are mostly used for the preservation of vegetables, such as celery, endive, lettuce, cauliflower, etc. The *walled pit* is partly sunk in the ground and partly above it. The walls are formed of brick or stone, finished with a wooden or stone coping, and covered with movable glazed sashes. Of this pit Buist says:

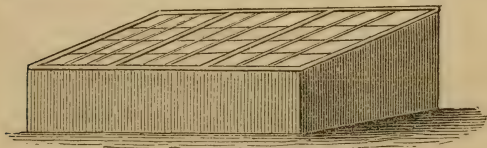
“There is no appendage to the garden of greater utility than this pit. It is two feet



THE WALLED PIT.

under ground and one foot above it in front, and two feet above it at the back, and six or seven feet wide in the clear. It is an excellent winter apartment for plants when covered with sash and mats. Filled with very rich earth, it produces very fine cauliflowers, which will be in use from March to May. If filled with warm manure early in February, it will produce cucumbers that will be in use from April to July, or radishes and small salading in any quantity.”

Hot Beds.—The common hot-bed frame is a bottomless box



THE HOT-BED.

of wood, with a sloping top and covered with a sash. It may be of any length or breadth, but from four to six feet wide, and from six to ten feet long is a good size. The sashes are made without cross-bars, the glass overlapping like the shingles of a house. The glass should be proportionally much smaller than it is represented in our engraving—not larger than seven-by-nine at most. The lap of the panes should not be over

half an inch. It should be bedded in soft putty, and the sash well painted. The sashes should be made to slide in grooves, so as to be conveniently moved whenever the bed may require to be opened, either wholly or partially, to the air.* The whole should be kept under cover when not in use. Directions for preparing hot-beds will be found in the next chapter, under the head of "Forcing."

Trellises.—Every garden should have one or more trellises for vines. They are of different kinds to adapt them to different situations and purposes. The posts should be made of some durable wood. Red cedar is the best. Under the head of the grape we shall describe the construction of the trellises required for their support. Designs for ornamental trellis-work may be found in "The House."

* Instead of the sashes for covering the frames, the following mode, called the German plan, may perhaps be adopted with advantage; but we have not tried it:

"Take white cotton cloth, of a close texture, stretch, and nail it on frames of any size you wish; take two ounces of lime-water, four ounces of linseed oil, one of white of eggs, two ounces of yellow of eggs; mix the lime and oil with very gentle heat, beat the eggs separately, and mix them with the former; spread this mixture with a paint-brush over the cotton, allowing each coat to dry before applying another, until they become water-proof. The following are the advantages this shade possesses over glass ones: 1. The cost being hardly one fourth. 2. Repairs are easily and cheaply made. 3. The light. They do not require watering; no matter how intense the heat of the sun, the plants are never struck down or burned, or checked in growth, neither do they grow up long, sick, and weakly, as they do under glass, and still there is abundance of light. 4. The heat arising entirely from below is more equable and temperate, which is a great object. The vapor rising from the manure and earth is condensed by the cool air passing over the surface of the shade, and stands in drops upon the inside, and, therefore, the plants do not require as frequent watering. If the frames or stretchers are made large, they should be intersected by cross-bars about a foot square to support the cloth. These articles are just the thing for bringing forward melons, tomatoes, flower-seeds, etc., in season for transplanting."

V.

HORTICULTURAL PROCESSES.

Every operation in gardening depends for its complete and universal success upon a knowledge of the structure of plants, the nature of soils and manures, and the laws of vegetable life and growth.—*M. Le Jardinier.*

I.—STIRRING THE SOIL.



THE attentive reader of the foregoing chapters will not require to be told that a thorough stirring and pulverizing of the soil, as one of the first operations in gardening, is absolutely essential to any high degree of success in the steps which follow. His knowledge of the structure of roots and the nature of their food has prepared him to appreciate the importance of the mechanical division of soils. He knows that the ground must be readily permeable by the tender rootlets, pervious to moisture and air, and so broken up that the water, acids, and alkalies penetrating it may efficiently act upon its soluble parts.

Spading is the most effectual method of stirring the soil, but, where the plow can be advantageously used, will hardly “pay” in this country. In small gardens, and in portions of all gardens, spading is the only practicable operation. Whatever the means used, let the work be *thoroughly* done. Downing says: “If I had to preach a sermon on horticulture, I should take this for my text—‘Stir the soil.’”

II.—APPLYING MANURES.

As the roots of plants usually penetrate every part of the soil of a garden, *manures, as a general rule, should be as thor-*

oughly mixed as possible with every part. Where the ground is to be plowed, they are generally spread upon the surface, and turned in by that process. In special cases, as will be seen further on, manuring in the hill or drill is advisable. Manures are also sometimes applied as top-dressings—that is, are spread upon the surface and not dug in. Vegetable and animal manures for common garden use should be thoroughly rotted and finely pulverized.

III.—FORCING.

Every garden should have one or more hot-beds for forwarding early tomatoes, cucumbers, cabbages, radishes, lettuce, etc. We have described the hot-bed frame in Chapter IV. The bed itself should be composed of stable manure and leaves, and must be not less than three feet deep. The manure should be first thrown in a heap to ferment, and worked over several times, adding water if it should become dry or musty. Sometimes the bed is made on the surface of the ground, and at others an excavation ten or twelve inches deep is made, in order to give the bed a less inconvenient elevation above the general surface. The manure and leaves should be spread evenly in layers, and pressed down. The bed should be at least six inches larger every way than the frame which is to cover it, and slope slightly toward the south. When neatly finished, put on the frame, close the sash, and keep all tight till the heat rises and steam appears on the glass. So soon as the heat rises, give the bed air at noon, or the warmest part of the day, but keep it carefully closed the rest of the time. In three or four days you may cover the surface with from four to six inches of fine, rich garden mold, and so soon as this is warmed through, the bed is ready for use. The seed may be sowed in drills, but, for facility of transplanting and to secure an unchecked growth, it is better to sow them in small pots, which are to be plunged in the mold. Sprinkle gently with water of the same temperature as the bed. When the plants appear they should have the air every day in which the weather will

permit. Open the bed also to warm, gentle rains, but keep it carefully closed against cold or heavy storms. At night keep it well covered with matting or straw. Transplant as soon as danger from frost will permit.

In the South this forcing process may be commenced early in the winter, but at the North not till February or March, according to the latitude and the season.

IV.—SOWING SEEDS.

The first thing to be attended to in seed-sowing is the preparation of the bed by thoroughly pulverizing the soil; and the smaller the seeds the more finely should the earth be pulverized. The soil should be freshly stirred and moist, but not too wet. The depth at which seeds should be buried varies with species and with the state of the soil. The objects are to exclude the light and secure sufficient moisture for the purposes of germination. The latter object requires large seeds, other things being equal, to be covered more deeply than small ones. If seeds are covered too deeply, unnecessary impediments are thrown in the way of the ascending shoots; and germination may be prevented altogether by the exclusion of the air. Most garden seeds are sown in drills. The earth should be pressed upon them with more or less force, according to the nature of the soil, in order to secure the necessary degree of compactness to retain the moisture and to support the plant after germination. Specific directions, where they are required, will be given under the name of each plant.

V.—TRANSPLANTING.

In transplanting, the principal points to be attended to are—care in taking up, to avoid injuring the tender extremities of the roots, through which, as we have seen, the plant receives its nourishment; planting firmly, to give it a secure hold of the soil; shading, when necessary, to prevent the evaporation from its leaves being greater than the plant, in its enfeebled state, can support; and watering, that it may not lack moist-

ure. Moist weather should also, if possible, be chosen for performing the operation.

As a general rule, in transplanting, the collar of the root should not be buried. Cabbages, balsams, and some other annuals, which throw out roots above the collar, furnish exceptions; also pears on quince stocks, which must be set so as to bring the place where the scion is inserted below the surface of the soil.

The operation of transplanting herbaceous plants should always be performed with a trowel, removing a little ball of earth with the plant. A damp, cloudy day, an evening, or just before a shower, is a favorable time.

Tap-rooted plants are transplanted with great difficulty, and, if the operation be attempted, should be taken up with a considerable ball of earth.

In transplanting trees much depends upon the knowledge and skill exercised. Thousands of fine trees are lost every year through the ignorance and carelessness of transplanters.

In taking up a tree or shrub for transplanting, be careful to injure the roots as little as possible. But in all cases the roots will be maimed more or less. The feeding power of the tree is to the same extent decreased, and it will not be able to sustain the draft made upon it by the stem and leaves. These must be diminished correspondingly by heading back or shortening. In preparing a place for the reception of the tree, avoid, if possible, the sites of old trees. Dig a hole considerably larger than the clump of the tree's roots, and from fifteen to twenty inches deep, placing the sods, if in sward land, in one heap, the soil in another, and the subsoil in a third. The hole should be filled with a mixture of the soil, subsoil, and rich, black loam, or well-rotted compost manure, to the height where it is proper to place the tree. With the hand or spade, shape the soil for the roots into the form of a little cone, on which to set the hollow in the center of the clump of roots. If this is done some weeks, or even months, before setting the tree, it will be all the better.

If the ground be dry, or if the roots have been much exposed to the air since the tree was taken up, soak the roots and the lower part of the trunk in water twelve or twenty-four hours. Cut off all bruised and broken ends of roots smoothly with a knife, and shorten-in the longest, so that the clump of roots may have a somewhat circular form. In cutting a root, always enter the knife upon the under side, and bring it out, with a slope, to the upper side, so that the fibers which may shoot out from the edges of the cut shall strike downward into the ground, instead of upward, as they would were the cut made as it commonly is.

With good, rich soil fill up under, among, around, and above the roots, straightening them out with the fingers, and placing them in a fan-like and natural position, being very cautious not to leave any, even small, hollow places among them. If the root is one-sided, make the most you can of the weaker part. At this stage of the work, if you have patience, it is an excellent plan to make a circular dam around the edge of the hole, and keep it full of water for a half hour or more. In setting evergreens, this, by some, is deemed almost indispensable, unless the ground is quite moist. Next, put in a little more earth, pressing it around the tree with the foot. After this, throw on an inch or so of loose earth, and the work is done.

Another mode of filling up around the trees, called *mudding-in*, has proved very successful. Make the circular dam around the tree first, or as soon as it is needed, then let one person slowly sift the soil into the hole upon the roots, while another constantly pours in water, thus keeping the earth in a thin, muddy state.

Very large trees are most successfully transplanted by removing them with large balls of frozen earth in mid-winter, and placing them at once in a hole previously prepared to receive them.*

* See Appendix, C.

The fundamental principle to be generally observed in transplanting is to head back the top of the tree in proportion to the loss of root that it has sustained by being removed.

Some fruit-trees may be moved much more easily than others. Downing arranges them with reference to this point in the following order: Plums, quinces, apples, pears, peaches, nectarines, apricots, and, last and most difficult, cherries. It is an invariable rule, *that the larger the tree the less the chances of success*. In the northern parts of the United States small trees should always be set in the spring.

Medium-sized trees—say five to ten feet high—may be set equally well either in the autumn or spring. Trees of large size should be moved late in autumn, in the winter, or quite early in the spring.

The evergreen tribe are, however, best planted out just as their buds begin to swell in the spring; but they are sometimes successfully set in autumn, and also during the last of May and first of June. If their roots are exposed to dry, out of the ground, they are almost certain to die.

VI.—WATERING.

Watering, like every other operation in gardening, has its rules, founded on the general principles laid down in our first and second chapters. The most important points to be remembered are: 1. That on the nature of the plant, the stage of its growth, and the dryness or dampness of the atmosphere depends the quantity of water required; 2. That the soil should never be saturated with water, too much moisture proving injurious as well as too little; 3. That the water should not be applied at the base of the stem, as it is through the extremities of the rootlets mainly that it must be taken up, and these, except in tap-rooted plants, are at a greater or less distance from the original starting-point; 4. That in summer, the proper time for watering plants is evening, but that in colder weather it is better to water them at mid-day; 5. That rain water is better than well or spring water, and that when

the latter is used it should be exposed to the air for some time before applying it; 6. That the water should never be colder than the plants to be watered.

VII.—HOEING.

The necessity for stirring the soil before planting has been already shown. As soon as the plants are well above ground it should be stirred again. In field culture, and to some extent in large gardens, this is done with the plow and cultivator. Where these can not go, the hoe must be faithfully applied. *The soil can not be stirred too often.*

One object in hoeing is the destruction of weeds. This should be thorough—the extermination should be complete. Spare not even the smallest. But keeping the weeds down is not the only good result attained by hoeing. The soil is thereby kept friable and porous, opened to the atmosphere and the fertilizing gases, and new, fresh, and cool surface is presented for the absorption of moisture. *Hoe deeply.* A mere scratching of the surface is not enough; and *do not fail to kill every weed.*

One year's seeding makes seven years' weeding.

VIII.—PROTECTION FROM FROST.

Straw and leaves laid several inches deep about their roots are very useful in protecting half-hardy plants during the winter. Garden-pots, empty boxes, barrels, hand-glasses, and cold frames should be brought into requisition in particular cases, for the protection of early plants from spring frosts, and later ones from those of the autumn. Common tumblers may be used for very small plants, but they must be raised whenever moisture accumulates.

Fruit-trees in blossom, or covered with young fruit just formed, may be protected by keeping up smoldering, smoking fires during the night in various parts of the garden, at the windward side. But little fire is required, the clouds of smoke effectually warding off the frost. The amount of fruit which

might often be thus saved would repay a hundred-fold the labor and care bestowed in this way.

IX.—MULCHING.

Mulching is placing mulch or moist litter of various kinds upon the surface of the soil over the roots of trees, shrubs, and herbaceous plants. Its uses are the retention of moisture, the prevention of injury by frost, and the promotion of an equable temperature. Strawberries thinly mulched, the crown being uncovered, are rendered more productive and continue longer in bearing, especially in hot, dry climates. Newly planted fruit-trees are often greatly benefited by mulching.

X.—DESTROYING INSECTS.

The foes against which the gardener is forced to wage a perpetual war of extermination, though individually insignificant, are in the aggregate most formidable. We will try to give a few useful hints of a general character to aid the reader in this warfare.

Sowing a garden with salt, at the rate of six or eight bushels to the acre, will cause many insects to disappear. It should be done in the autumn. Digging the soil in the winter, and thus exposing it to the frost, will destroy many grubs, etc. Wide-mouthed bottles, partly filled with molasses and water, and hung up in a garden, make excellent traps for the moths, which are the parents of many destructive vermin. Mr. Downing mentions an acquaintance who thus caught and destroyed in a single season *three bushels of insects*, and preserved his garden almost free from them. A bright fire of resinous pine, tar, shavings, or any other combustible, kindled in the garden at night, on a platform erected for the purpose, will attract and destroy millions. Birds are among the best friends of the gardener, and should by no means be destroyed, although some of them may eat a few raspberries or cherries. Toads live almost entirely upon insects, and do no harm in a garden. Induce as many of them as possible to make it their

home. Hens and chickens should have access whenever it can safely be permitted.

To drive insects away from plants various preparations are useful. A writer in the *Southern Cultivator* recommends the following:

"Put into a barrel of water a quarter of a pound of camphor, in pieces of the size of a hickory nut, and let it stand a day before using. Water your plants with this. The barrel may be refilled many times before the camphor will have all been dissolved. A cupful of strong lye put into the water will add to the strength of the mixture by causing the water to take up more camphor. Camphor is very offensive to most insects." Tobacco-water is another efficient remedy. Lime, charcoal-dust, ashes, soot, snuff, and sulphur sprinkled upon plants prove a defense against most destroyers. To expel the striped bug from cucumbers, squashes, etc., water the plants daily with a strong decoction of quassia, made by pouring four gallons of boiling water on four pounds of quassia, in a barrel, and, after twelve hours, filling the barrel with water. The intolerable squash or pumpkin bug may be thoroughly driven off by a decoction of double strength, containing a pound of glue to ten gallons, to make it adhere.

The most effectual and the cheapest remedy for the striped bug, however, consists in defending each hill of melons, cucumbers, squashes, etc., by a box about fifteen inches square, the sides being eight to ten inches high, covered with millinet or some similar thin material.

The following recipe for making a "barrier to insects" is given in the *Gardener's Chronicle*. It may be easily tried:

"Take of common resin 1½ lbs.; sweet oil, 1 lb.; place them in a pipkin over the fire until the resin is melted; stir the materials together, that they may be well blended; when cold the substance formed, which the discoverer calls 'rezoil,' will be of the consistency of molasses. To use the rezoil it should be spread with a brush upon shreds or any fitting material, and wrapped round the stem of the plant; if any support is used,

that should be brushed over also. No insect can possibly, or will attempt to cross this barrier; the rezoil never dries, but always remains sticky and clammy—its action as a trap is therefore obvious.”

But, however numerous and effective the other remedies, “eternal vigilance” can not be dispensed with in dealing with the pests of the garden.

XI.—SAVING SEEDS.

Choose the best plants for seed—the most *true to their kind* and the most perfectly developed; allow the seeds to become perfectly ripe before gathering them; gather when dry, and especially take care that they are perfectly dry when put up; store them in paper bags carefully labeled, and keep them in a dry, cool place. Great care is necessary in raising seeds to preserve the sorts unmixed, as varieties of the same species or similar species are almost sure to mix if planted near each other. If you raise more than one kind of corn, or pumpkin, or cucumber, or melon in the same garden, you can not be sure of pure seed. The squashes and pumpkins may mix, or the melons with either, the pollen of one being conveyed by the wind, or sometimes by bees or other insects, to the pistil of the other.

XII.—ROTATION OF CROPS.

Why rotation of crops is beneficial has been already shown, and if the reader has forgotten, let him turn back to the first chapter. The following is a good rotation for a given portion of a garden:

First	year,	cabbages.
Second	“	onions.
Third	“	carrots, beets, or parsneps.
Fourth	“	potatoes or turnips.
Fifth	“	celery, spinach, or lettuce.

Celery is excellent to precede asparagus, onions, cauliflowers,

or turnips; old asparagus beds are good for carrots, potatoes, etc.; strawberry and raspberry beds do well for the cabbage tribe, and the cabbage tribe may be followed by the tap-rooted plants—carrots, beets, etc.

A large portion of every garden, even at the North, should be made to produce two crops each season. All the space occupied by early peas, beans, and potatoes can be made available for turnips and cabbages. Turnips (English or Dutch) may also be sown broadcast among the corn and later potatoes after the last hoeing.

XIII.—PROPAGATION.

There are, properly speaking, but two modes of propagating plants—by seeds and by division. By the first the species is perpetuated, and new varieties raised. The second mode multiplies specimens of the individual itself, with all its peculiarities, which may be and generally are lost in the seed.

There are several distinct modes of propagating plants by division, all, however, depending for their success upon *the presence of leaf-buds*, each of which, as we have seen, being capable, under favorable circumstances, of forming a distinct and independent individual.

1. *Suckers*.—Some plants, such as the rose, the raspberry, the lilac, etc., throw up suckers or sprouts from their roots. These spring from what have been described as adventitious buds. We have only to divide these from their parent and transplant them in a suitable soil to secure their independent growth. Offsets and runners are of a similar nature to the suckers of the woody plants. The former are young bulbs which form by the side of the old one, and merely require breaking off and planting. The latter are shoots springing from the collar or crown of a plant, and throwing out roots at their joints. These have only to be separated from the parent plant to become independent individuals. The strawberry is the most noted example of this mode of propagation.

2. *Layers*.—The tendency manifested by many plants to throw out roots from their joints early suggested to gardeners

the idea of making layers. A twig growing out of a tree, at a point not far from the ground, is bent down, and the middle portion of it buried just under the surface of the soil, and fastened there by means of a hooked peg, or by a stone or turf placed above it. Success is rendered more certain by checking the downward flow of the sap. This may be accomplished by cutting a slice off the under side of the part of the twig that is placed under ground, or, more perfectly, by entering the knife on the under side at this point, and splitting the twig upward about one or two inches, fastening the split open with a little wedge or pebble. The sap accumulating at this point induces the throwing out of roots, and the conversion of the shoot into a new plant. Trees or shrubs purposely headed down for raising layers are called *stools*. A single quince-bush, thus made into a *stool*, and its twigs layered, is capable of producing many finely-rooted plants in a single season. Of some kinds of layers nearly every bud will form roots of its own.

3. *Cuttings*.—Cuttings are shoots removed from the parent tree or plant without roots. The branches nearest the ground are considered best for cuttings, as the tendency to throw out roots is greater in them than in those more elevated. They should be cut off just below a joint. Some species, however, as the willow, the currant, etc., will throw out roots from any part of the stem, and generally succeed with even the most careless planting. The best time to take off cuttings is in November, but in a cold climate they are more likely to succeed if kept in damp mold in a cellar, and not planted till spring. In planting, bury them to the second joint, leaving one or two joints above the surface of the soil. Press the earth compactly about the lower end. Cuttings of delicate plants are generally *struck* (rooted) in pots, and sometimes it is necessary to cover them with a bell-glass, to prevent too rapid evaporation.

4. *Slips*.—Slips are cuttings made from the root or collar of a plant, or branches stripped off, with a small portion of the root or stem attached. They are treated like other cuttings. Many kinds of fruit-trees may be readily propagated by slips.

5. *Budding*.—Budding consists in introducing the bud of one tree or shrub, with a portion of the bark and wood adhering to it, below the bark of another tree or shrub. The operation is thus performed: With a sharp budding-knife, upon a smooth place on the side of the stock, cut a longitudinal slit an inch or more long. Across the top of this cut a transverse slit from a quarter to half an inch long, so that both slits, taken together, shall resemble the letter **T**. Next, cut from your stick of buds a thin slice of bark, with a little wood in the central portion of it, entering the knife about half or three fourths of an inch below, and bringing it out about as far above a bud. This slice of bark and wood, taken together, is called a *bud*, the part of the bud which grows into a twig being technically called its *eye*.

With the ivory haft of your budding-knife, or, if you have not such a knife, with any little wedge of wood or ivory, raise up the corners of the slit in the stock. Taking hold of the bud by its foot-stalk, enter it, and gently push it down to the bottom of the incision. The eye of the bud will now be from one fourth to three fourths of an inch from the transverse part of the slit. The part of the bud, if any, projecting above this transverse slit, should be cut off, by passing the knife through it, into the transverse slit again, so that the upper end of the bud and this transverse part of the slit shall make a good joint together. Bind the bud firmly with shreds of bass-matting, so as to cover every part of it except the eye. Woolen yarn or corn husks will answer when no matting is at hand. The stock (trunk or branch) should be from an eighth of an inch to not more than an inch in diameter.

To prepare a *stick of buds* for budding, take a scion of the present season's growth, and cut off the portions of each end of it containing buds that are imperfectly developed. Next, cut off the leaves at a point about in the middle of their stems or *footstalks*. The



STICK OF
BUDS.

buds which are to be used lie in the angle on the upper side of these stems.

Budding is generally performed in the summer or early part of autumn. It is essential to success—1st. *That the bark of the stock should part freely from the wood*, and 2d. *That the bud which is to be inserted should be well ripened*, otherwise it will not have vital energy sufficient to establish itself in its new location. Whenever these conditions can be secured, budding may be successfully performed. The buds put in early, however, especially in the South, make a considerable growth the same season. Buds should be inserted on the north side of the stock, if practicable. The operation is one of some nicety, and to be successful must be performed *rapidly, and with fresh, healthy buds, smooth cuts, and cleanly rising bark*. A few days after budding, the stock should be cut off within ten or twelve inches of the bud, and when this has grown three or four inches, the stock may be cut off again near the budded shoot. All sprouts, or “robbers,” as they are called, that appear on the stock must be carefully removed.

Care should also be taken not to allow branches from the main shoot of the bud to grow, and to secure an upright position of it, a ligature of the matting may be passed around the sprout and the upper end of the old stock.

In spring budding, some gardeners recommend to make the incisions in the form of an inverted **L**, but we see no good reason for this inversion, and believe that the other mode is equally successful.

Annular budding is applied with success to trees of hard wood and thick bark, or those which, like the walnut, have buds so large as to render the common mode of budding difficult and uncertain. A ring of bark is taken from the stock, and one of equal size, containing a bud, from the scion. If the stock be larger than the scion, an entire ring



TREATMENT OF
THE BUD.

will not be taken off, but only what may be filled by the ring of bark from the scion. If the ring of bark from the scion be too large for the stock, it will be reduced so as to just inclose the stock. When thus fitted, tie with matting, and cover the wound with clay or grafting-wax, and the work is done.

6. *Grafting*.—In grafting, a shoot with two or more buds on it, instead of a single bud, is transferred from one tree or shrub to another. The operation, in all its forms, consists essentially in bringing in contact portions of growing shoots, so that the *liber* or inner bark of the two may unite and grow together. The same general principles apply to it as to budding.

The shoot to be transferred is called a *scion*. The best time to cut scions is from the middle of January to the last of February, although they *may* be taken from the trees at any time from late autumn until spring. In order to keep them until they may be used, nothing more is necessary than to thrust their lower ends into the ground, in a shady place—say close on the north side of the trunk of the tree from which they were cut; or a better way is to set them half their length deep in a box of fine soil in a cellar.

In cutting scions, take from the extremity of the limb of a tree that part of it which grew the preceding season, and keep the shoot or twig entire till wanted for use.

Scions are united to their stocks in several ways. Whatever may be the mode of operating, however, the principle is always the same—namely, *the sap-vessels of the graft and the stock must be so adapted to each other that the sap can flow uninterruptedly from the one to the other.*

Cleft grafting is the mode in most common use. Stocks from half an inch to two inches in diameter are usually worked over in this way. The whole top of a large tree may thus be headed back and grafted, so as to become even more valuable than one that was grafted in the nursery.

The operation is performed as follows: Saw off the stock



CLEFT
GRAFTING.

crosswise, then pare the end smoothly with a knife. Next, split it down about two inches with a thin, sharp knife, driven with a hammer. A narrow wedge is now driven into the middle of the cleft, so as to keep the top of it open about a quarter of an inch. Cut the scion (which should not contain more than three or four buds) at the lower end, in the form of a wedge, about one and a half inches long, contriving to have a bud or eye at the top of the part so formed, to insure greater success. The scion is next to be inserted on one side of the stock, and fitted nicely into the cleft, so that the inner bark of the outer side of the scion shall exactly meet that of the stock. On large stocks two scions are thus inserted, one on each side.

The scions being adjusted, carefully withdraw the wedge which stands erect between the scions. Make a ball of wax, and lay it on the head of the stock, between the scions, and press it down, and spread it so as to cover the head, and lap over three fourths of an inch all around upon the bark, and rub it down smoothly, being careful to make an air and water-joint around the scions and over the end of the stock. Where the wax passes over the corner of the stock, it should be quite thick, to prevent it from cracking. Then cover the cleft on each side quite below its lower extremity, and the work is done. The next spring cut off nicely the poorest scion in each stock, as one is usually quite sufficient.

For small seedling stocks, or small sprouts on larger trees, less than half an inch in diameter, it is well to adopt the *whip* or *splice* method.

Cut the stock with a sharp knife, obliquely upward, without bruising or starting the bark, and the scion downward, with a corresponding angle, to make the two parts fit nicely, care being taken that the inner bark of the stock and scion exactly meet. Then lay the parts together, and bind them snugly with a strand of matting or bass-bark, and cover the splice with grafting-wax or clay, to shield it from the air and water.

Allied to splice grafting is what is called *saddle grafting*. On stocks of half an inch or more in diameter and scions of

the same size, this mode is sometimes employed with excellent success. In this process, cut the stock with a drawing-knife upward, forming a wedge; then split with a fine saw the scion, and with a knife pare away each side to a point, so as to fit the stock; place the parts together, and bind them firmly with matting or bark, and cover the whole with clay or grafting-wax. At the end of two months the union will generally be sufficiently perfect to allow the removal of the covering and the ligature, which, if left on too long, will injure the growth.

In-arch grafting is used when others will scarcely succeed. The two trees must stand close to each other. A twig of each, without being cut from its tree, must be pared with a long, corresponding slanting cut, and the two raw edges must be fitted nicely, and bound firmly together, and the joint covered with the composition. When the union has taken place, the trees are so separated as to leave the scion on the tree where it is wanted.

A mode called root grafting is practiced extensively in nurseries. The two-year seedling stocks are headed down to within an inch or so of the collar or crown; they are then split, and the scion inserted, as in common cleft grafting. The scion is held in its place by a piece of matting bound round the stock. The stocks to be used for this purpose are generally taken up in the fall, grafted in the winter at the fireside, and packed away in the cellar till spring, when they are properly planted; the point of insertion of the graft being covered with the soil. No wax or clay is necessary. Scions may also be grafted on small roots by common splice grafting. The point of union should be covered with soil to the depth of two inches.

Grafting may be performed at almost any season of the year with scions properly kept; but by far the best time is from the middle of February, in mild weather, all along until the middle of May at the North, and till the end of March at the South—stone-fruits first, and other fruits somewhat later.

Neither grafting nor budding can be successful, unless between different varieties of the same species, as the apple upon

a seedling apple-tree stock; or between nearly allied species of the same genus, as between the apple and the pear, which unions are comparatively imperfect and short-lived; or, thirdly, between nearly allied genera, as between the cherry and the plum, which maintain a feeble existence for a limited period, and then die. All unions, therefore, between widely different genera and species, are utterly impossible, as the graft can not live upon the sap supplied by the stock, any more than a lion can be fed upon grass.

To produce dwarf trees, Apple is grafted upon Paradise (or Doucin) stocks; the Pear upon the Quince, Thorn, or Mountain Ash; the Peach upon the Plum; the Plum upon Mirabelle Plum seedlings; the Cherry upon the Cerasus Mahaleb, and, in general, any tree upon any other kindred tree of slower or smaller growth.

The stock and the graft (scion or bud) exert influences upon each other mutually. The stock often affects the size and flavor of the fruit borne by the graft. Of a graft or stock, either may communicate its own diseases and infirmities to the other. It is pretty well established, also, that stocks bearing early fruits have an influence in accelerating the ripening of the fruits which may be made to grow upon them by grafting.

Grafting Wax.—To make grafting wax of an excellent quality, take four parts of resin, two of beeswax, and one of tallow; melt the whole together, pour the composition into cold water, and work it over thoroughly, pulling it as you would molasses candy. The hardness of the wax may be increased or lessened by applying more or less tallow. In cold weather keep the composition in warm water, and in warm weather in cold water, to secure the proper consistency for use. In using it, the hands should be slightly greased.

XIV.—PRUNING.

The principal objects sought to be attained by pruning are to promote the growth, improve the form, and increase the fruitfulness of trees. No operation in horticulture requires

the exercise of more knowledge, judgment, and skill, in order to the attainment of complete success; but in general no operation is more carelessly, ignorantly, and bunglingly performed, or more frequently neglected.

Pruning to promote the growth of a tree proceeds upon the principle that the sap which would have been appropriated to the support of the branches, or parts of the top, taken off, will go to increase the vigor of the parts which remain. This is true within certain limits, but the process must not be carried too far. *Sufficient top must be left to supply leaves for the elaboration of the sap.*

Young trees, two or three years from the seed, or one year from the graft, are not infrequently headed down to two or three buds, on purpose to strengthen their growth. A single bud is then trained vertically, and the rest pruned away in the course of the summer. In such cases, the growth of the top being attended with a corresponding increase of fibrous roots, the tree at once becomes vigorous and healthy.

Peach trees, in our climate, are highly benefited by thus shortening-in annually, in the spring, one half, or thereabouts, of their entire growth of the previous summer, all over the heads of the trees.

Dwarf pears on quince also require a similar heading-in, annually each spring, so long as they continue to make a growth of scions.

Pruning to improve the form is applied mostly to ornamental trees, to which almost any desirable shape may be given by this means. If one part of a tree should outgrow another part, the former may be shortened-in in winter, and the shoots pinched off the next summer, till the sap is thrown in the right direction into the weaker branches, and the balance restored. When you desire the new shoots of a branch to take an upright direction, prune to an inside bud; while, if you wish an open, spreading top, prune to an outside bud, etc. Do not trim the stems or trunks of your trees (whether ornamental or fruit-trees) to bare poles, but allow the branches to form near the

ground, as they naturally will in open ground. Your ornamental trees will thus be more beautiful, and your fruit-trees more likely to bear well.

Everything that is favorable to rapid and vigorous growth is unfavorable to immediate fruitfulness, hence pruning to induce fruitfulness is performed after vegetation has commenced. This checks the growth of the wood, impedes the circulation of the sap, and promotes the formation of fruit. Top pruning or shortening-in is the most common form of pruning to induce fruitfulness. Pruning the roots has a similar effect. The operation of root pruning is thus performed:

At a few feet from the trunk of the tree, varying the distance according to its size, dig a circular ditch around it, eighteen or twenty inches deep, cutting off all the lateral roots smoothly, close to the circular mass of earth in which the tree stands, removing the outer pieces of roots from the surrounding ground, as much as can be done conveniently. Fill up the trench with good, rich soil, and the tree will, in this country, generally be brought into a permanent fruit-bearing state. Repeating the operation annually, apples, pears, and other fruit-trees may be rendered productive dwarfs—even so as to be planted only six or eight feet apart. And, if at the same time we apply the *shortening-in* process above described, they may be kept in a beautiful pyramidal form, and rendered very profitable. This work may be done in autumn, in winter, or early in the spring.

Pruning ought to be performed with sharp tools. When the saw is used, the ends of the limbs should afterward be carefully pared with a knife. They should then be covered with some composition to protect them from the weather. Downing's *Gum-Shellac* is admirably adapted to this purpose. This preparation is made by dissolving a quantity of the gum in alcohol, so that the composition shall be of the consistency of thin molasses. The liquid should be kept in a wide-mouthed bottle, the cork of which should have a wire (running through it into the bottle), with a sponge attached to the end of it.

When the object of pruning is to promote the growth or improve the form of a tree, the operation is generally performed in the winter or early in the spring. Some, however, recommend pruning in May or June.

XV.—TRAINING.

In England, where fruit-trees generally are trained on walls and trellises, this process requires much time and labor on the part of the gardener. In this country it is hardly applied at all, except to vines and pear-trees, and to the latter only occasionally. The principal object of training is to produce from a certain number of branches a larger quantity of fruit than would grow on them if left in their natural state. This is effected by spreading and bending the branches so as to form numerous depositions of the returning sap, aided, where the tree is trained against a wall, by the shelter and reflected heat which the latter affords.

Directions for training the grapevine will be given under its proper head.

A new mode of training fruit-trees, practiced in the north of Russia, is well deserving of trial in the colder parts of New England, especially for cultivating the peach. A tree, one year from the graft, is headed down to two healthy, strong wood-buds. These are trained horizontally, about ten or twelve inches from the ground, to a south wall—perhaps the north side of a wall might do quite as well, in our more changeable climate. These *arms* are suffered to throw up vertical shoots, which become covered with fruit-spurs. These vertical shoots are kept shortened-in, to a length of not more than about one or two feet; and these, with the two horizontal arms from which they spring, and the short trunk of about ten to fourteen inches in length, constitute all there is of the tree above ground. The whole tree may be covered, through the winter, with two feet or more of soil heaped over it, with a deep bank of snow, or with straw, evergreen boughs, or the like.

Peaches, we are convinced, can be raised in this way where they fail entirely under ordinary treatment. It has hardly been fairly tried, however, in this country.*

* In preparing the condensed directions for transplanting, budding, grafting, pruning, training, etc., contained in this chapter, we have been deeply indebted to the valuable little manual of George Jaques, entitled "A Practical Treatise on the Management of Fruit-Trees," which we cordially recommend. See also Barry's "Fruit Garden" on these points.

VI.

THE KITCHEN GARDEN.

I consider the kitchen garden of very considerable importance, as pot-herbs, salads, and roots of various kinds are useful in housekeeping. Having a plenty of them at hand, a family will not be so likely to run into the error which is too common in this country, of eating flesh in too great a proportion for health.—*Dr. Deane.*

I.—ESCULENT ROOTS.

1. THE POTATO—*Solanum Tuberosum.*

THE potato, called by the French *la pomme de terre*, and by the Germans *die Kartoffel*, is a native of the elevated equatorial regions of South America, and is still to be found in a wild state in the neighborhood of Quito and other places. It appears to have

been introduced into North America and cultivated by the Virginia colonists as early as 1584. A few years later it was carried to England by Sir Walter Raleigh.

The varieties of the potato are numberless; and, while old sorts are constantly disappearing, new ones are every year coming into notice and taking their places. The duration of a variety is believed by Knight and others to be limited to fourteen years. Very few sorts continue to be cultivated even that length of time. New varieties are readily produced by planting the seed found in the balls. The operation is a simple one, and should more frequently be undertaken. There is no doubt but that varieties will yet be obtained in this way far superior to any yet known. We give in the Appendix full directions for producing and proving new sorts.

To give a list of the best varieties of the potato, were it practicable, would be useless. The best sorts of this year may be put in the second or third rank next year; besides,

those to which the preference is given in New York may be considered inferior in Pennsylvania, and worthless in Georgia. Select for planting those varieties which experience has decided to be best adapted to your soil and climate, and to combine the various qualities required for table use.

In a cold, moist climate the potato thrives best in a light but rich loam. In a dry, hot climate a heavy loam is preferable, except for the earliest crop. Vegetable manure is best for the potato. Ashes and, where the soil needs it, lime, may be added with advantage, but, in garden culture, animal manures should, so far as possible, be avoided, as their use tends to make the tubers moist and waxy. The manure should be well rotted, and thoroughly mixed with the soil. Where you can not get sufficient manure of the right kind to properly enrich the whole soil, you may scatter it into the drill or hill to the thickness of three or four inches.

In garden culture, plant in drills made with the plow or the hoe, from eighteen to twenty-four inches apart (some varieties requiring more room than others), placing the sets about nine or ten inches apart in the drills. Cover to the depth of from four to six inches, according to the texture and condition of the soil—a heavy, moist soil requiring less depth of covering than a light and dry one.

In reference to the sets or seed, many and contradictory opinions prevail. Some contend that the largest-sized potatoes alone should be used for planting; others prefer a medium size; while many use those which are too small for the table. Some plant them whole, while others divide them, making from two to eight sets from each. Even scooped-out eyes have had their advocates. We have no room in this little work to advance arguments or adduce evidence, and must be content to give our opinion (as indicated by the mode pursued in our own garden), which, however, we believe to be based on sound theory and supported by general experience. *We choose for planting medium sized, fully matured, and every way sound and perfect tubers*—such as we would select for the

table—and, if we have plenty of seed, plant them *whole*. If there be a deficiency of seed, or the price be very high, we divide them longitudinally, making two sets of each potato, and plant them with the eyes upward. They should be cut a week before planting; and it is a good plan to roll them in ground plaster of Paris or old slaked lime. Something may be gained in earliness by cutting the potato transversely in the middle, and planting only the seed end, which should be set upright in the ground.

In garden culture, potatoes should generally be hoed at least three times, to keep the weeds down, earthing them up a little each time; but if the ground be little infested with weeds, twice will do. The first hoeing should be given soon after the shoots appear above the surface of the ground. If they should be partially covered with earth by the operation, no harm will be done. Potatoes should never be hoed after the blossoms appear. Pinching off the flower-buds will considerably increase the crop of tubers.

Potatoes should not be harvested till the tops are mostly dead. They should be exposed to the sun only long enough to dry them for storage. Store in a dry cellar (when there is danger from frost), and cover them with sand or straw. When sprouts begin to grow, as they will toward spring, carefully rub them off. Their growth will greatly injure the quality of the tuber for table use. Those intended for seed should be frequently turned over to prevent premature growth.

Of the *potato rot*, as it is called, little can be profitably said. Its cause and remedy are yet to be made known. As preventives, a dry soil, the use of lime and ashes, the absence of fresh stable manure, early planting, and new, healthy varieties are recommended. For arresting the disease, cutting off the tops on the first appearance of the blight is sometimes effectual.

Potatoes for an early crop are planted in this country from the first of January to the first of May, according to the climate and season. In the latitude of New York they may in

ordinary seasons and in favorable situations be put into the ground from the tenth to the twentieth of March.

For raising *Irish* potatoes (as they are invariably called there) at the South, the plan published by Mr. Peabody of the *Soil of the South* is undoubtedly a good one. We have tried the same mode with fair success at the North, using here, however, less straw. Mr. Peabody's directions are substantially as follows:

"As soon after Christmas as possible, plow or spade up the plot of ground designed for the potato patch, and lay it off in furrows two feet apart, and eight or ten inches deep. Fill these furrows with decomposed straw or leaves. Divide each potato once, and place the sets, cut side downward, upon the straw; now level the ridge made by the furrow, covering seed, straw, and all, and then scatter straw evenly over all to the depth of eighteen inches or two feet. No further culture is required. In the dryest seasons the yield will be greater than when planted in the ordinary way. Many have failed in this mode of culture because they have not applied half straw enough."

2. THE SWEET POTATO—*Convolvulus Batatas*.

This best of all esculent roots belongs to the *convolvulaceæ* or bind-weed family. It is a native of the East Indies, but grows in perfection in our Southern States. It is raised in large quantities in Delaware and New Jersey, and even farther north, but the quality of the tubers is inferior to that of those produced at the South.

A dry, loamy soil, inclining to sand, is best for the sweet potato. It should be well manured. The special manures indicated by an analysis of the root are potash and the phosphates.

Where the season is sufficiently long to mature it, the sweet potato may be propagated by cutting the seed into slips, and planting them where they are to grow; but at the North the sprouts must always be started in a hot-bed. Place the pota-

toes in the bed early in April, covering them three or four inches deep. They will throw up sprouts in three or four weeks. When these are about four inches above the surface, they may be separated from the parent tuber and planted out in hills, leaving the latter to put out other shoots for future plantings. The hills or beds should be about four feet apart, and raised from six inches to a foot above the common level of the ground. Some make continuous ridges four feet apart, and plant the sprouts on the top, about a foot asunder. They must be kept free from weeds till the vines cover the ground. They are fit for gathering when the vines are dead. They are very difficult to preserve through the winter. A careful seclusion from air and light, the absence of frost, and absolute dryness are essential to their preservation. The best way to cook them is by baking.

3. THE TURNIP—*Brassica Repa*.

The French call the turnip *le navet*, and the Germans *ber Stedrübe*. It has been in cultivation at least two hundred and fifty years. There are many varieties. For early crops the English or Flat White, the Early White Dutch, and the Early Yellow Dutch are to be preferred. For later sowing we would name the Purple-Topped Swede, Skirving's Improved Swede, and the White French. Rivers' Swede and Ashcroft's Swede, two varieties lately imported by the Patent Office Department, are highly spoken of; but we have not tested them.

Turnips thrive best in a rich, sandy loam. Bone-dust, lime, ashes, and plaster of Paris are good special manures. Sow in drills about two feet apart. Thin out the plants gradually to six or eight inches apart. They may be readily transplanted if desired. Stir the soil well, and keep the weeds in subjection. English turnips do well sown broadcast. Sow the early sorts from February to May, according to climate and season. Other sowings may be made in July and August for winter use. In the latitude of Georgia they may be sowed as late as October. Harvesting should be deferred till the approach of

cold weather—or at the South they may remain in the ground all winter.

4. THE BEET—*Beta Vulgaris*.

The beet (Fr. *Beterave*) is a native of the south of Europe. It takes its name from the form of its seed-vessel, which resembles the Greek letter *beta* (β). The best varieties are Extra Early Turnip or Bassano, the Early Turnip, the Long Blood, and the London Blood.

A light soil, well enriched with manure and well broken up, suits the beet. It will grow in almost any soil. Sow in drills a foot apart and about an inch deep. Drop the seeds three inches apart, cover smoothly, and press the earth firmly upon them. Radishes may be sown in the same bed, as they will be removed before the beets are ready for thinning. Keep the ground well stirred and free from weeds, and thin the beets to about six inches apart. Sow the early sorts in March, or the first of April, in the latitude of New York. The later varieties may be sowed in May or June.

In gathering your beets, cut off the leaves an inch or two above the collar, and be careful not to break or bruise the root. To preserve them through the winter, store in a dry cellar. They keep best packed in sand.

5. THE CARROT—*Daucus Carota*.

The carrot (Fr. *Carotte*) is supposed to have been introduced into Europe from the island of Crete. The Early Horn is the most forward in ripening, and fully equal in color and flavor to any other sort. It may be sown from the middle of April to the middle of July in the latitude of New York, and in the South from January to April inclusive. The Long Orange grows very long and large, but is not equal in flavor to the Early Horn. The Altringham is a bright-red variety, of an excellent flavor, and keeps well for winter use. It is not quite so hardy as the other sorts.

The carrot succeeds best in a light, rich soil. It must be deeply dug and well broken up, or the roots will grow forked

and crooked. Choose a warm spot and a calm day for sowing. Sow in drills half an inch deep, and for the Early Horn nine inches apart. For the other varieties twelve inches apart is better. Radishes may be sowed in the same bed. Stir the ground frequently and deeply, and thin out to from three to six inches apart. The latter is the proper distance when the plants are to be left to grow to the full size. The directions for preparing and preserving them for winter use are the same as for beets.

6. THE PARSNEP—*Partinaca Sativa*.

This very palatable and exceedingly nutritious root is a native of Sardinia, and in its wild state is said to be poisonous. In French it is called *le panais*. The best variety is the Sugar or Hollow Crown. Soil and culture the same as for the carrot and beet. Bone-dust and ashes are the special manures most likely to be required. Late in the fall take up as many as you need for winter use. The rest may remain in the ground, as frost seems to improve their flavor. In the South, lift them as wanted during the winter.

7. SALSIFY—*Tragopogon Porrifolium*.

The Salsify, or Oyster Plant, is a native of England, and is less known in this country than it deserves to be. Sow and cultivate the same as the parsnep. A portion of the crop may remain in the ground all winter. Prepared and cooked according to the following directions, it will be found to resemble the oyster in flavor:

Scrape the roots slightly, soak them in water for an hour, and then boil till quite tender. Now let them drain for a short time; meanwhile make a thick batter with white of eggs beaten up with a little flour. Grate the roots tolerably fine, press them into flattened balls of the size of an oyster, dip them in the batter, roll them into grated crackers, and fry them in a pan till brown. Another way is to parboil, cut in slices, and fry either with or without the batter. Try it.

8. JERUSALEM ARTICHOKE—*Helianthus Tuberosus*.

This plant is a species of sunflower, and is occasionally cultivated for its tuberous roots. It may be planted like the potato, and will grow anywhere.

II.—THE LEGUMES.

1. THE PEA—*Pisum Sativum*.

This universally cultivated plant originated in the south of Europe. The catalogues of the seedsmen embrace twenty or more varieties. The earliest is the Prince Albert, a dwarf grower with small pods. Next to this, in point of earliness, is the Cedo-Nulli, which is more prolific and of an equally fine flavor. The Early Washington or true May Pea is one of the best bearers, and, we think, the finest-flavored of all the early varieties. The Dwarf Blue Imperial is considered an excellent pea. Blue Surprise, Champion of England, Knight's Tall Marrow, Matchless Marrow, and New Mammoth are all excellent sorts for later planting. For three varieties, we would choose the Cedo-Nulli, the Early Washington, and Champion of England, planting in the order in which we have named them. For a fourth we would take the Matchless Marrow or the New Mammoth. But another person would, perhaps, choose differently. A new variety called the Chicarras or Spanish Pea, and said to be rich-flavored and marvelously productive, was distributed in some of the Southern States last year (1857) from the Patent Office, but we have not heard the results of any experiments which may have been made with it.

For the early sorts a light, warm, dry, and moderately rich soil is to be preferred. If manure be used, it should be well rotted; but it is better to take ground which has been made sufficiently rich by a previous year's manuring. The later and taller varieties require a heavier soil.

You may plant your early peas at almost any time when the ground is not actually frozen, covering with mulch if necessary. In the latitude of New York they may generally be planted before the twentieth of March—sometimes on the first—and

require no protection. In the South, any time from January to March will do. Plant in double drills, from six to nine inches apart, according to the variety. The rows should be three feet apart for the smaller sorts, and from four to six for the larger. Cover the early kinds one inch deep, and the late an inch and a half. The sticks should be from two and a half to three feet for the early sorts. The Matchless Marrow reaches the height of five or six feet, and the New Mammoth is a still loftier grower. When the plants are about two inches high, stir the ground well, and earth them up a little. Repeat this operation several times before setting the sticks or brush, which should be done when the peas are from six to eight inches high. If the season be dry, watering will much increase the crop. Topping off the points of the vines soon after the first blossoms appear will hasten the growth of the fruit. The smaller kinds of early peas may be planted about half an inch apart in the drills, and the later and larger sorts from a third of an inch to an inch. It is well to soak them twenty-four hours before planting.

To forward an early crop, plant in lines from east to west, and stick a row of cedar, spruce-fir, or other evergreen branches along the north side, sloping so as to bend over the plants at one foot or eighteen inches from the ground. These protect them from cold rains and at the same time leave them open to the full influence of the sun. Behind this temporary hedge there should be a close board fence, a brick or stone wall, or a high close hedge.

Beans, cabbage, lettuce, radish, or celery may be planted between the rows of peas, especially of the earlier sorts.

Peas which are to be ripened or dried should not be sowed before the tenth of June, as all earlier crops will be infected with bugs.

2. THE BUSH-BEAN—*Phaseolus Vulgaris*.

The bean is believed to be a native of India, whence it was brought to England near the close of the sixteenth century. In

one form or another it is universally esteemed. Of the common Bush, Snap, or Kidney bean there are many varieties. Among the best are the Early Mohawk (a very hardy sort), Early Six Weeks, Early Valentine, Early Dun Colored, Early Pink Eye, Early White Marrow, Late Valentine, and the Royal Kidney. The tender pods of all these sorts are eaten as string-beans; but they are also excellent taken from the pods after they are nearly or quite grown, and boiled and prepared in the same way that Lima beans usually are. For this mode of cooking we prefer the Pink Eye and the Early White Marrow.

Beans will thrive in almost any soil; but for an early crop it should be light and dry. If the ground be too wet, they are liable to rot. Bone-dust, ashes, and super-phosphate of lime are very useful as manures. The bean is destroyed by a slight frost, and can therefore seldom be planted, in this climate, till the middle of April, or even later. Plant once in two weeks till the last of August, to keep up a succession for the table. Plant in drills from eighteen inches to two feet asunder, dropping the beans two inches apart, and covering them about an inch deep. Give them frequent and deep hoeings, drawing a little earth to the stems.

The Small White bean, so extensively used in New England for baking, may be planted in any vacant spots in the garden in June or July, and will require no care except to keep the weeds down.

3. THE COMMON POLE BEAN—*Phaseolus Multiflorus*.

Of the common running or pole bean (*le haricot à rames* of the French), the best varieties are the Dutch Case Knife, London Horticultural, White Cranberry, and Scarlet Runner. Plant in hills from the first to the middle of May, and give them poles when they begin to put forth runners; or, better, set the poles first, and plant the beans around them. Or they may be planted in drills along a border, or on each side of a walk, and trained on a slight trellis of laths and lines, and thus be made ornamental as well as useful.

4. THE LIMA BEAN—*Phaseolus Limensis*.

Of the *Phaseolus Limensis* there are three varieties cultivated in the United States—the Green Lima, the White Lima, and the Carolina Sewee. The White Lima is to be preferred. It requires a strong, rich soil, and should not be planted till settled, warm weather, as the seed is very liable to rot in the ground if the weather be cool.

Beans of all kinds can easily be preserved for winter use, with very little loss of flavor. You have only to pick them in the same state as when for immediate use, and dry them thoroughly in the sun. You may have green beans all the year with very little trouble.

5. THE PEA-NUT—*Arachis Hypogea*.

This plant, known also as the pindar ground pea and ground nut, is a *legume* bearing its seed under ground. It is cultivated extensively in some of the Southern States as a field crop, but a few hills may find place in the Southern garden. Make the hills two and a half or three feet apart, and drop three or four of the shelled seeds in each. Cover them two inches deep. Thin the plants to two in a hill, and keep the ground free from weeds.

III.—THE CABBAGE FAMILY.

1. THE COMMON CABBAGE—*Brassica Oleracea*.

The cabbage (Fr. *chou pomme*) is one of the most ancient of garden vegetables. It is mentioned by Pliny as being much esteemed in his times. It was a favorite with the Romans, who probably introduced it into England. Its varieties are almost numberless. Of the common cabbage, the following are the most desirable: Early York (very early, and of a delicate flavor), Large Early York (a little later), Early Nonpareil, Early Vanack, Early Dutch, Flat Dutch or Drumhead, and the Red Dutch. The last-named is fit only for pickling. For two varieties we should choose the Early York and the Drumhead. The Early Dutch comes into use between these two. The Early Nonpareil and the Early Vanack are a little later than the Early York,

but are in other respects equally desirable. The Early Winningstadt, a variety sent out from the Patent Office, is said to be worthy of trial.

The cabbage will grow in any soil sufficiently enriched and properly prepared. It must be plowed or dug deeply, and well pulverized. Common salt, ashes, plaster of Paris, and bone-dust may be used with advantage, as the plant abounds in sulphur, phosphorus, soda, and potash. Animal manures may also be freely used.

For producing early spring cabbages, various plans are pursued. The best mode for general adoption is the following: About the tenth of September, for southern New York (a little earlier for New England, and a little later for the South), sow seeds of the Early York, Nonpareil, or Vanack in a seed-bed of rich, light soil. If the weather be dry, sprinkle the bed with water a few times, to promote germination. When large enough to transplant, set them quite thickly in a cold frame or walled pit, for protection during the winter. The frame or pit may be covered with boards, adding straw, if necessary, when the frost is severe. Give the plants air whenever the weather will permit. Carefully exclude the rain, as too much moisture will injure them. Early in the spring transplant into the compartment of the garden designed for them. Where the winters are not too severe, they may be brought forward a week or two earlier by planting them out in the fall in good, rich soil, previously prepared by throwing it up into high ridges, running east and west, and about two feet apart. On the south sides of these ridges set out the plants one foot apart. They will then be shielded from the north winds, and receive all the benefit of the sun. When the weather becomes severe, cover with straw, laying it across the ridges. This may be removed whenever mild weather returns. Early cabbages may also be obtained by starting the plants in a hot-bed, sowing in February or March.

In transplanting cabbages, especially the early ones, the growth of which it is important not to check, take them up

with a trowel, removing considerable earth with them, in order not to disturb their roots.

For summer, autumn, and winter use, sow Early Dutch and Drumhead in April and May. Transplant into rows two feet apart, and eighteen inches apart in the row. Give the plants a copious watering the evening previous to taking up, and water again after setting out. The whole secret of their after-culture lies in *frequent and deep hoeing*. Hoe while the dew is on, if practicable. Never strip off the lower leaves.

To preserve cabbages in perfection through the winter, the following is the best mode with which we are acquainted: As late in the fall as the weather will permit, dig trenches eighteen or twenty inches apart, parallel to each other, and of any convenient length. Now dig out your cabbages with a spade, and transplant them into these trenches as close together as they will stand, covering root and stem to the lower leaf. Around this bed raise a kind of frame with old posts, rails, or boards and earth, making it a little higher at one side than the other, and high enough at the lower side to prevent its roof or covering from coming in contact with the cabbages. Across this frame place poles, lath, or narrow boards, and cover the whole thickly with straw, bean haulm, corn-stalks, or any material of that sort. In this way you may have cabbages up to April, of as fine a flavor as when transplanted into the trenches. A few may be transplanted into a similar trench in the cellar, where, of course, they will require no covering.

2. SAVOY CABBAGE—*Brassica Oleracea Subanda*.

This member of the great cabbage family takes its name from Savoy. It differs from the common cabbage in the wrinkled character of its leaves. There are only two varieties worthy of culture—the Curled and the Drumhead. The former is to be preferred for family use. It is superior in delicacy to the common cabbage. Cultivation the same as the winter varieties of the latter.

Brussels Sprouts (*chou de Bruxelles*) is considered a sub-

variety of the Savoy. It is a celebrated vegetable in Europe, but is not often seen in American gardens. Sow in April, and transplant in June into rows eighteen inches apart. Cultivate like cabbages. The stem grows to the height of two feet or more, and is crowned with numerous little heads of from one to two inches in diameter. After they have been frosted (which is necessary to their perfection), they may be gathered. To prepare them for the table, soak an hour in cold water; boil about twenty minutes; drain; season to the taste; stew gently in a sauce of cream or floured butter, stirring them constantly. They are sometimes served with tomato sauce. They may also be cooked simply as cabbages, and eaten with meat.

3. BORECOLE—*Brassica Oleracea Fimbriata*.

This plant, also called German Greens (Fr. *chou vert*) and Scotch Kale, is one of the most delicate and valuable of the cabbage tribe. It has large, wrinkled leaves, forming an open head or stool. It is perfectly hardy, frost only improving it. It remains green and eatable all winter, requiring only a slight protection in the Northern States, and none at all at the South. For winter and spring greens it is unequalled. Sow and cultivate the same as the cabbage. No garden should be without it.

4. THE CAULIFLOWER—*Brassica Oleracea Botrytis*.

The cauliflower is a kind of cabbage, with long, pale green leaves, surrounding a mass or head of white flower-buds. The French very appropriately call it *le chou-fleur*. It was introduced into England from the island of Cyprus. There are only two true varieties—the Early and the Late.

The cauliflower requires a very rich soil and careful culture. For the early spring or summer crop, sow the seed from the first to the twentieth of September, in a properly prepared seed-bed. When the plants are two inches high, transplant them into a bed of very rich, light soil, three inches apart each way, so that they may grow firm and stocky for removal to their

final place of growth. This should be a bed of the richest light earth, two feet deep, and one third of it well-decomposed manure, surrounded by a frame or wall, and covered with glass or shutters. An open exposure, sheltered from the northwest, is essential. The bed should be prepared about the first of October, to give it time to settle. Into this bed remove your plants about the middle of October (or earlier in a very cold climate), setting them eighteen inches apart. Take them up carefully with a trowel, and in planting press down the soil pretty firmly upon the roots, giving it a gentle watering at the same time. No further watering will be required till spring. Protect the plants carefully against frost, covering the sash or shutters with matting or straw if necessary; but do not neglect to give them the air every mild, clear day. They must not be left open to the rain, as too much moisture will cause them to "damp off," as it is called, at the neck. When the weather becomes warmer in spring, copious waterings may be given. Soap-suds and other liquid manures are applied with advantage. Early lettuce may be sowed in the same bed between the rows of cauliflowers.

When a cauliflower has attained its full size, which will be indicated by the opening of the border, cut off the head with several inches of the stem, and most of the leaves, these being taken off, however, before cooking.

For the autumn crop sow in April, transplant into rich soil, two feet apart. Hoe frequently and deeply, and if the season be dry, water copiously. They must not suffer from drouth. You may know when they need water by the drooping of the leaves. The hills about the plant should form a hollow basin to retain the moisture.

The cauliflower is a wholesome and nutritious vegetable, and should be more generally cultivated. To cook, soak an hour in cold water with a handful of salt in it; then boil till tender in milk and water, taking care to skim the surface, so that not the least foulness may fall on the flower. It may be served up with sauce, gravy, or melted butter.

5. BROCCOLI—*Brassica Oleracea Botrytis Cymosa*.

This plant is similar to the cauliflower, from which it is supposed to have originated. It differs from the latter in its undulating leaves, its larger size, and its color. It is also a hardier plant, but not so delicate in flavor. Grange's Early White and the Purple Cape are the best varieties. White recommends the latter for the South. Sow in April or May, and treat in the same manner as the late cauliflower. They will commence heading in October. To have them during the winter, in a northern climate, they must be pitted in a cellar or shed. South of Virginia they need little, if any, protection.

The turnip cabbage (fohl rabi), *Brassica napo brassica*, and the turnip-rooted cabbage, *Brassica caulo rapa*, may be added to our list, although they are little cultivated. The former, of which the *Char Navet de Laporie*, from France, is the best, requires the same cultivation as the cabbage, and the latter should be treated like the Swede turnip. The Green Stemmed and the Purple Stemmed are recommended.

IV.—SPINACEOUS PLANTS.

1. SPINACH—*Spinacea Oleracea*.

This vegetable—*l'épinard* of the French—is a native of Spain, and is extensively cultivated on the continent of Europe. It is excellent for greens, and should receive more attention than has yet been accorded to it in this country. There are three varieties—the Prickly-Seeded, the Round-Seeded, and the Flanders. The first is best for sowing in the fall for winter crops, in a cold climate; but for spring sowing, and for a mild climate, the second is to be preferred. The Flanders is little known in this country, but is said to be superior to either of the other sorts.

Spinach requires a rich soil. Sow in drills a quarter of an inch deep and nine inches apart. For winter and early spring crops, sow about the last of August, and again about the middle of September. For summer use, sow from the first of

April to the twenty-fifth of May. Select an open situation. If the soil be light and dry, it must be trodden down or rolled with a roller on sowing. Thin out the plants to nine inches apart. Hoe frequently and thoroughly. The winter crop will require the protection of a thin layer of straw during the severe weather.

2. NEW ZEALAND SPINACH—*Tetragonia Expansa*.

This is an annual plant from New Zealand. It furnishes a good substitute for spinach during the summer, when the latter fails, but, as it requires to be forwarded in a frame or hot-bed, is hardly worth the trouble it costs in a northern climate.

Garden Orache (*atriplex hortensis*) and Garden Patience (*rumex patientia*) are sometimes used in the place of spinach, but are only worthy of a mere mention here.

V.—ASPARAGINOUS PLANTS.

1. ASPARAGUS—*Asparagus Officinalis*.

The asparagus plant is a native of the sea-coasts of Great Britain. The varieties may be reduced to two—the Green Top and the Purple Top.

Asparagus is propagated only by seed, but in forming a new bud it is the most economical plan to procure plants two or three years old from some nurseryman or gardener. If you purpose to raise your own plants, sow early in the spring, in a seed-bed formed of rich, sandy loam, in drills an inch and a half deep, and eighteen inches from row to row, pressing the earth firmly upon the seed. Keep the bed free from weeds by frequent hoeing. About the first of the following November spread stable litter or something of the sort over the ground, to keep the young plants from the frost.

For the permanent bed, a rich, sandy loam is best. Select, if possible, an open situation and a warm southern exposure. Trench or spade deeply, digging in a plenty of manure, as the soil can hardly be made too rich or too deep. Over a plot forty feet long and twenty feet wide (which will be large

enough for a moderate family), sow from fifty to a hundred pounds of salt, incorporating it with the soil to the depth of four or five inches. The ground having been well pulverized and leveled, lay it off into beds about four feet wide, with alleys two feet wide between them. Drive a stake at each corner. This work should all be done toward the end of March. Now cut a small trench or furrow six inches deep, lengthwise of the bed, and about nine inches from the edge. Take up the plants very carefully from the seed rows, and set them in this trench or furrow, nine inches apart, with the crown of the root two inches below the surface, and cover them at once. Proceed in the same manner with the whole, making the rows twelve or fourteen inches apart. A damp day should be chosen for the operation, which must be carefully and skillfully performed. Keep the weeds down during the summer, and on the approach of severe weather cover the beds to the depth of three or four inches with rotten manure. The first two years the plants are permitted to run up to stalks, that strong crowns may be formed at their base for a future crop. The winter dressing of manure must be continued while the bed lasts, the tops being cut off and removed each fall. In the spring, so soon as the frost will permit, loosen the surface of the beds with a manure fork, introducing it three or four inches into the soil, and turning it up, being careful not to injure the crown of the roots. A full crop may be expected the fourth year after planting, or at the South a year earlier. Cut when about four or five inches above the surface. The shoot should be cut off slantingly about three inches below the surface, using a long, sharp-pointed knife. The cutting should never extend beyond the middle of June.

With good culture, an asparagus bed will continue productive for fifteen years, but too many shoots must not be cut from it, nor the cutting prolonged beyond the time we have named.

2. SEA KALE—*Crambe Maratima*.

This plant is closely related to the cabbage, and is called by

the French *le chou marin*. It is easily cultivated, and we recommend our readers to try it.

Sea Kale flourishes best in a sandy soil, well enriched with decomposed vegetable manure and a top-dressing of salt. Sow the seed in March or April, watering the bed freely if the weather be dry. Thin out the plants gradually to two or three inches apart, keeping the bed free from weeds by frequent hoeing. In November cover the crowns of the plants with a few inches of earth. In the spring, prepare beds as for asparagus, and remove your plants in a similar manner, setting them about two feet apart, and covering the crown of the root about two inches deep. Water occasionally, if the season be dry, and hoe frequently. Allow no plants to go to seed. Early in November give the bed two inches of well-rotted manure, forking it over lightly at the same time. Now cover the crowns of the plants with three or four inches of light soil, or with pure sand if you can readily procure it. The bed being thus finished, cover the crowns of the plants with large pots or boxes, sinking them one or two inches in the ground, and carefully stopping any holes in them. Then procure a quantity of leaves from the woods, mix them with about the same quantity of warm stable manure, and cover the ground and boxes to the depth of twenty inches. In severe weather throw over this some dry litter or boards. The materials will come to a heat in two or three weeks; and in three or four weeks more it will be time to examine a pot or two, and when the plants are found to have sprouts from six to eight inches long, they may be cut for use. Remove a portion of the earth, and cut close to the crown, and then replace the box or pot, and the other materials, and other shoots will soon appear. The plants will continue in a vigorous state of growth for two months, giving you a supply for the table nearly the whole winter; and having your bed once formed, the forcing process just described may be repeated every year for fourteen or fifteen years. In the spring remove the covering gradually, digging in a few inches of the decayed material to strengthen the plant for a future crop.

To have sea kale without forcing, cover the plants early in the spring with eight or ten inches of sand, or fine, light soil. They will produce strong shoots, which, on clearing the ground around them, will be found to be of a clear white color; or they may be blanched by covering them deeply with oat-straw. They are useless unless well blanched. The shoots are cooked in the same way as asparagus.

VI.—ESCULENT BULBS.

1. THE ONION—*Allium Cepa*.

The onion is supposed to be a native of Asia. Its culture is of "inscrutable antiquity." The most useful varieties are the following: Red Dutch, Portugal, Strasburg, and Silver Skinned. The first two varieties named are very hardy and keep well, but are of too strong a flavor to suit a delicate taste; the last two are mild-flavored, but are not good keepers. The Silver Skinned is much used for pickling. For winter use we should choose the Strasburg.

The onion requires a light and friable, but rich and somewhat moist soil. The manure used should be well decomposed. It need not be deeply mixed with the soil, as the roots of the plant do not extend far below the surface. The whole must be thoroughly pulverized. The onion may be sowed so soon as the ground is in a condition to be worked in the spring. Sow in drills half an inch deep and nine or ten inches apart. After sowing, press the soil down firmly with a board. Keep the bed free from weeds, and stir the soil frequently, but not deeply. The onion should not be earthed up at all. It is better that the bulb should be formed entirely above the surface. They should be thinned out to two inches apart. This we consider the best mode of culture for the main crop. •

For an early crop, sow the seed thickly in drills early in April; and when the bulbs have grown to the size of peas, lift them, and put away in an airy loft, to keep till the next spring, when set them in shallow drills, covering very lightly, if at all. They will be ripe in June or July. Soap-suds will not be

wasted on the onion bed. Soot and ashes are also good for top-dressings.

To preserve the winter crop, pull in a dry day, put them under a shed or similar shelter to dry, and store in a loft where they can have plenty of air.

Onions may be sparingly eaten as a salad, but in the raw state are rather difficult of digestion. They are most wholesome boiled. Boil twenty minutes in water, with a little salt; then pour off the water entirely, and put in equal parts of hot water and milk, or skimmed milk alone, and boil twenty minutes more. They may be fried or roasted, but are more difficult of digestion in those modes of cooking.

2. THE TOP OR TREE ONION—*Allium Proliferum*.

This is a very hardy species, producing little bulbs at the top of its seed-stem. It is easily cultivated, comes early to maturity, and never fails to produce a crop. Plant the little bulbs very early in the spring, cultivating the plants in the same way as the other species. They will be ready for use in May or June. If large bulbs are required, the seed-stem must be broken off. Those not thus treated will produce seed for the next year. The top bulbs are considered excellent for pickling.

3. POTATO ONION—*Allium Tuberosum*.

This is supposed to be the kind of onion that was worshiped by the Egyptians. It is said never to produce either flowers or seed. It is propagated by offsets from the bulbs which should be planted in March, in drills eighteen inches apart. Set them three inches below the surface, and six inches apart. Keep the ground well stirred, but do not earth up the plants. They may be lifted by the top as they ripen, which will be shown by the drooping and withering of the leaves. In this climate they generally ripen in August. They are milder in flavor than those raised from the seed, but the bulbs are not so large.

4. THE SHALLOT—*Allium Ascalonicum*.

This plant—*l'eschalote* of the French—was introduced into

Europe from the town of Ascalon, in Syria. It is little used in this country, except by the French, but is to be preferred to the onion for some of the purposes of cookery. It is propagated by offsets, which may be planted in the spring, like the sets of the onion. Store in the same way as other onions.

5. THE LEEK—*Allium Porrum*.

The leek (Fr. *porreau*) is cultivated in France to an almost incredible extent, as it forms an absolutely essential ingredient of the soup on which the great body of the nation lives. The London Flag and the Musselburgh are improved varieties of the common leek.

The soil for the leek must be rich, deep, and well worked. The manure used must be well decomposed. Sow the seed thinly, in drills six inches apart and half an inch deep. Thin out the plants to an inch apart. When about eight inches high, transplant them into a bed previously prepared for them. Shorten the roots to about an inch from the plant, and cut off two inches or more from the extremity of the leaves. Dibble them in drills eight inches apart, and so deeply as the plant will admit, without covering the young leaves pushing from its center. Choose moist or cloudy weather for the operation; or, if dry, give the plants a copious watering. Hoe frequently, drawing the earth about the plants as they grow. They will be fit for use in October. The whole plant is much used in soups and stews, but the most delicate part is the blanched stems.

6. THE GARLIC—*Allium Sativum*.

The garlic is much used in southern Europe in sauces and salads; but its unpleasant odor will, we suspect, debar it from American tables almost entirely. The bulb is divisible into numerous parts called "cloves," by means of which it is propagated. Plant in the spring, in drills two inches deep and six inches apart. When the bulbs are grown, take them up, clean them, and hang up in bundles. A very slight flavor of garlic is not unpleasant in soups and stews.

7. THE CHIVE—*Allium Schænoprasum*.

This little alliaceous plant is sometimes used as a spring salad, or a seasoning for soups. It is easily propagated by dividing the bulbs or roots either in autumn or spring, and planting them in any bed or border. It will grow anywhere, but prefers a moist, rich soil. It is generally spoken of in the plural as chives or cives.

VII.—SALAD PLANTS.

1. LETTUCE—*Lactuca Sativa*.

The lettuce is appropriately placed at the head of the list of modern salad plants. There are two grand varieties of the lettuce—the Cabbage and the Cos or Upright—and numerous sub-varieties of each. The best of the cabbage sorts are the Butter or Early, the Brown Dutch, the Victoria, and the Curled India. They will come into use in the order we have named them. The last will make good heads most of the summer. Of the Cos or Upright sorts the best are the White and the Paris.

A deep, rich, sandy loam suits the lettuce plant. Salt and ashes are useful as special manures. Sow as early as the season will permit, and repeat at different times during the spring and summer. For forcing in a hot-bed, the Early Cabbage should be chosen. For a winter crop, the Brown Dutch may be treated as we have recommended for Early York and Nonpareil cabbages. In the South it will need no protection.

The Cos lettuce must be sowed in September, protected during the winter, and transplanted out in the spring; or sowed in a hot-bed in February. The Cos varieties are improved by tying up the leaves several days before cutting, to blanch them.

Lettuce may be had through the winter, by sowing in October in a walled pit or frame, and protecting from frost by means of sash and straw mats, giving it air in warm, clear days. The earth should be within eight inches of the glass. Let the plants stand eight or ten inches apart. Water occasionally, and pick off all decayed leaves. It is a good precau-

tion to surround the frame or pit with leaves or straw. Lettuce requires frequent and deep hoeings.

2. CRESS—*Lepidum Sativum*.

Of the garden cress there are two varieties—the Curled or Pepper-Grass and the Broad-Leafed. The former is generally preferred. It forms an excellent salad, and is easily cultivated. To have it early, sow in a hot-bed in February. In the open ground it may be sowed about the last of March. The soil should be light and warm for the first sowing. Sow in shallow drills, covering the seed very lightly. To have it during the season, sow every fortnight. It should grow rapidly, and be used when quite young and crisp.

Water-cress is found in brooks, in various parts of the United States, but is seldom cultivated. It also is excellent for a salad.

3. MUSTARD—*Sinapis Alba*.

This salad plant is cultivated in the same manner as cress. Cut the leaves for use while they are crisp and tender. Wash them carefully in water to free them from the sand that is liable to adhere to them. To have a constant supply, make frequent sowings. Table mustard is made from the seeds of *Sinapis nigra*.

4. ENDIVE—*Cichorium Endiva*.

This plant is a native of China and Japan, and is much cultivated in Europe. The variety generally used for salads is the Green Curled. The Broad-Leaved or Batavian is used for cooking, in stews and soups.

A light, rich soil is desirable for the endive. An open exposure should also be chosen. The best time to sow for an early crop is about the first of July in this climate. If sowed earlier, it is apt to run quickly to seed. In New England, however, it may be sowed by the middle of June. In the South, White says, sow in August and September. Sow in drills about four inches deep, and about a foot apart, and scatter sufficient earth upon the seeds to cover them, leaving the drills

to be filled up in the process of future cultivation. Water once or twice, if the weather be dry. When about two inches high, thin out the plants to ten inches apart; and when nearly full grown, the leaves may be gathered up in a close, rounded form, and tied with a shred of matting or other soft string, drawing up a little earth to the stems at the same time. Choose a dry day for this operation, and tie up only a few plants at a time, or in proportion as they may be wanted for use. They may also be blanched by covering them with pots or boxes. It will take about ten days in warm weather, and about twenty in cold weather, for the leaves to blanch for use.

For late crops, sow about the end of July. To have endive in perfection during the winter, it must be moved into frames or walled pits about the first of November, taking up considerable earth with the roots. Give air and light in mild weather, but protect from heavy rains and severe frosts.

5. CELERY—*Apium Graveolens*.

Celery is a native of Great Britain, and in its wild state is a coarse, rank weed. Cultivation has made it one of the pleasantest-flavored of all salad plants. There are several varieties. The Red Solid is the hardiest, and is therefore generally preferred in the colder portions of our country; but the White Solid is crisper and more delicately flavored. Cole's Superb Red and Seymour's White correspond with the Red Solid and the White Solid, and are the kinds to be preferred.

The soil best suited to the celery plant is a moist, rich vegetable mold, to which salt, ashes, and lime may be advantageously added, as special manures. The animal manures used must be thoroughly decomposed. The cultivation of celery embraces three distinct operations:

1. *Forwarding the Plants*.—Sow in a hot-bed from the first to the middle of March, or in a warm border in the open ground, at several different times, from the first of April to the tenth of May. The seed-beds should be of light and finely-pulverized soil. Rake in the seeds lightly and regularly, and

in dry weather water moderately, both before and after germination. Liquid manures are very beneficial. Thin out the plants to half an inch apart.

2. *Stocking or Hardening*.—When the plants are two or three inches high, prick them out, at successive times, into intermediate beds, three or four inches asunder, watering if the weather be dry, and protecting from frost with boards or mats, if necessary. This intermediate bed should be made very rich with well-rotted manure. The plants that remain in the seed-bed should be shortened by cutting off their tops occasionally, to make them grow more stout, and watered frequently. Of the transplanted ones, those intended for late celery should also be cut off nearly to the crown several times, which will retard them and make them grow stout. When the plants are from six to twelve inches high, they must be transplanted into trenches previously prepared for them.

3. *Trench Culture*.—It is well to trench the compartment of the garden intended for the permanent culture of celery, as this process turns the richest soil to the bottom where it will be most needed for the nurture of the plant. In ground thus prepared, or at least deeply spaded or plowed, mark out the trenches a foot wide, and from three to three and a half feet apart; dig out each trench lengthwise, ten or twelve inches in width, and a light spit deep, that is, six or eight inches. Lay the earth dug out equally on each side of the trench; put at least four inches of very rotten dung into the trench, then pare the sides, and dig the dung and parings with several inches of the loose mold at the bottom. A pint of salt to every fifty feet of trench, thoroughly mingled with the soil, is recommended by some, and must, we think, prove beneficial. Trim the tops and roots of the plants, and then set them in single rows along the middle of each trench, allowing four or five inches distance from plant to plant. When this work is finished, give the plants water in plenty, and occasionally water them from time to time, if the weather be dry, and likewise let them be shaded, till they strike root and begin to grow.

Their after-culture consists in stirring the soil in the trench frequently with a small hoe, and watering copiously in dry weather. About the middle of August or the first of September, you may begin to earth up your plants for blanching. Tie the leaves together, or hold them tight with one hand, while you draw the earth, which must have been finely pulverized with the spade, around the stems, being careful not to cover the heart or center of the plant. You may now repeat this operation once in ten days, till the plants are fit for use; but this earthing-up must never be done when the plants are in the least wet. About the first of October earth up firmly and evenly, and with a decided slope from the base, nearly to the tops of the leaves. To take up the crop, it is best to begin at one end of a row, and dig clean down to the roots, which then loosen with a spade, and they may be drawn up entire, without breaking the stalks.

To preserve this plant during the winter, on the approach of frost take up a part of the crop, and lay it under sand for winter use. That left in the beds may be covered with litter, to be removed in mild weather. In planting, the white and red sorts may conveniently be mixed in the same trench, so that only one trench need be opened to obtain both.

6. THE RADISH—*Raphanus Sativus*.

The radish (Fr. *rave*, Ger. *ritig*) is a native of China. Of the numerous varieties, the Scarlet Short Top is the earliest and best. The Early Salmon, Red Turnip-Rooted, White Turnip-Rooted, White Summer, and Yellow Summer are all desirable sorts. For supplying the table in winter, the Black Spanish should be chosen.

Any deep, rich soil, well broken up, will do for the radish, but for early crops it is desirable to have it light, dry, and warm. Sow as early as the weather will permit, and for a continued supply repeat your sowings about once in two weeks through the season. The Black Spanish may be stored in the cellar, and will keep till spring.

7. HORSE RADISH—*Cochlearia Armoracia*.

The horse-radish grows best in a rich, moist soil, contiguous to water, but may be cultivated in almost any situation. It is propagated by sets from the root, which may be dropped into holes made with a dibble fifteen inches deep, in soil previously trenched or deeply spaded. Fill up the holes with fine earth. The plants should stand about ten inches apart. It may be planted either in spring or in November. In taking up the roots for use, you may leave a small portion at the bottom to serve as a new set. In the fall, lift enough for winter use, and leave the rest in the ground. It is an excellent condiment. The root is scraped into shreds, or grated fine, and eaten with vinegar.

8. CORN SALAD—*Fedia Olitoria*.

This plant, sometimes called lamb's lettuce, is a native of Europe. It is in use to some extent as a spring salad. Sow from the tenth to the twentieth of September, in shallow drills six inches apart, and cover lightly, pressing the soil with a roller or a board. Keep it clear of weeds, and in November cover with straw, and pick the leaves as wanted. If the winter prove mild, it may be in use the whole season.

VIII.—THE CUCUMBER FAMILY.

1. THE CUCUMBER—*Cucumis Sativus*.

The cucumber is found wild in almost all warm countries, and is cultivated all over the world. The best varieties for forcing, or for an early crop in the open air, are the Early Short White Prickley and the Long Early Frame. The Long Prickley, Negley's Seedling, and California Long Green are good for the main crop. Negley's Seedling is best for the table, but, we believe, not so productive as some of the other sorts. The Gherkin, from France, is much prized for pickling.

A light loam is best for the cucumber, but it will grow in almost any soil, and is very easily cultivated. Make excavations for your hills a foot in diameter and fifteen inches deep,

at the distance of six feet apart each way. Fill these holes with a rich mixture of well decayed manure and light soil, adding, if convenient, a little ashes, bone-dust, and common salt. Raise the hills a little above the level of the ground, by covering the manure mixture with loam, and make them slightly concave on the top. Plant about the first of May, or so soon as the season will admit, putting eight or ten seeds in a hill. When the plants have made rough leaves, thin them out to three in a hill. Nipping off the points of the vines to make them branch out will hasten their fruiting. Stir the ground frequently, and keep it free from weeds.

By forcing in hot-beds, cucumbers may be had in March or April; but few except professional gardeners care to undertake the somewhat delicate operation. They may be much forwarded, however, with little trouble, by the use of small boxes covered with glass, or by the following method:

Make a hole, and put into it a little hot dung; let the hole be under a warm fence. Put six inches deep of fine rich earth on the dung. Sow a parcel of seeds in this earth, and cover at night with a bit of carpet or sail-cloth, having first fixed some hoops over this little bed. Before the plants show the *rough* leaf, plant two into a little flower-pot, and fill as many pots in this way as you please. Have a larger bed ready to put the pots into, and covered with earth, so that the pots may be plunged in the earth up to their tops. Cover this bed like the last. When the plants have got two rough leaves out, they will begin to make a *shoot* in the middle. Pinch that short off. Let them stand in this bed till your cucumbers *sown in the natural ground come up*; then make some little holes in good, rich land, and, taking a pot at a time, turn out the *ball*, and fix it in the hole. These plants will bear a *month sooner* than those sown in the natural ground.

The second week in July is sufficiently early to plant for the fall and pickling crop, in the Northern States. In the South, the late planted crops are apt to be destroyed by the melon-worm.

Cucumber plants being climbers by means of their tendrils, some branchy sticks being placed to any advancing runners, they will ascend, and produce fruit at a distance from the ground, of a clean growth, free from spots, and well flavored.

2. THE MELON—*Cucumis Melo*.

The melon is a tropical plant. Our finest varieties are supposed to have come from Persia and Affghanistan. In the south of Europe it is much used as an article of food by the lower classes. This use may be made of it with advantage by all classes in every country where it can be produced. Its varieties are numerous and constantly increasing. The common mush-melon, formerly so extensively cultivated, has generally given way to newer and better sorts, among which the Christiana, Extra Green Nutmeg, Beechwood, Sweet Ispahan, Netted Citron, Rock Melon, Cantaloup Prescott (a French variety), and the Arica from Japan are much esteemed. [For the water-melon (*cucurbita citrullus*), which belongs to a different genus of the same natural order, see the next section.]

The melon should have the same soil and culture as the cucumber (except that it requires less moisture), and may be forced in a hot-bed, or forwarded by means of the glass-covered boxes in the same way. Never allow more than three plants to grow in a hill. Three will produce more fruit than six. As the fruit appears and attains the size of a walnut, place under each a piece of tile, slate, or glass to protect it from the dampness of the earth, and assist it in ripening by reflecting the rays of the sun.

IX.—THE PUMPKIN FAMILY.

1. THE PUMPKIN—*Cucurbita Pepo*.

The pumpkin is a native of India and the Levant. Numerous varieties are cultivated, some of which, originated by means of crossings with the squash, can hardly be distinguished from that vegetable. The Cashaw and Large Cheese are the best that we have tested. The Valparaiso is said to be a good

variety; and the Honolulu, from the Sandwich Islands, and the *Citronelle de Touraine*, from France, are new varieties which we would recommend for trial.

The pumpkin will grow anywhere, and with almost any treatment. The culture indicated is the same as that for the melon or the cucumber. It should never be planted in a garden, if one has other ground in which it can be cultivated, as it will be sure to mix with and contaminate the squashes, melons, and cucumbers. New England farmers often raise a large crop by planting it with their field corn.

2. THE SQUASH—*Cucurbita Meloepo*.

This plant forms the connecting link between the pumpkin and the melon. It originated in the Levant. The best summer varieties are the Early Bush and the Early Bush Crooknecked. Of fall and winter sorts the Boston Marrow is the best that has a fair trial in various soils and climates. It is difficult now, however, to obtain it pure. The Golden Imperial, Adam's Favorite, and Golden Mammoth are new or less widely known varieties, but are much esteemed by those who have tried them.

The soil and cultivation required are the same as for pumpkins, melons, and cucumbers.

3. VEGETABLE MARROW—*Cucurbita Succada*.

This is a species of gourd. It is cooked like the egg-plant when young; when half grown is used as squash; and when matured is used for pies. Cultivated the same as the squash.

4. THE WATER MELON—*Cucurbita Citrullus*.

The water-melon belongs to the same natural family or order as the musk-melon or cantaloup, but to a different genus or subdivision. It is a native of the tropics. The best varieties are the Black Spanish, the White Spanish, the Orange, the Mountain Sweet, the Carolina, the Texas, the Sugar White, the Syrian, and the Lawson. The Texas, the Sugar White

(sometimes called Ice Cream), and the Syrian are all new varieties—new to us, at least. We have tested only the Texas, which is a superior sort.

The best soil for the water-melon is a light, sandy loam. Animal manures, well decomposed, bone-dust, and super-phosphate of lime should be used in moderate quantities. Cultivate the same as mush-melons or cucumbers. If grown near any other melon, squash, pumpkin, or cucumber, you can not be sure of pure seeds; and the same remarks will apply to the other members of the pumpkin and cucumber families.

X.—MISCELLANEOUS OBJECTS OF CULTIVATION.

1. INDIAN CORN—*Zea Mays*.

Every garden should have a few rows of Indian corn. The best garden sorts are the Extra Early and Eight-Rowed Sweet. New varieties, however, are constantly being produced.

To produce a good crop, Indian corn requires a good soil, and there need be no fear of giving it too much manure. A handful of ashes in each hill will benefit the crop. Plant in hills three feet apart, dropping five or six seeds in a hill, but thinning out to three or four at the first hoeing. If sufficient manure have not been mixed with the soil on plowing or digging, put a small shovelful in each hill. Plant so soon as the season will permit, and make successive plantings till August, if you desire a continuous supply. Hoe frequently, making broad, flat hills in earthing up the plants. Never plant more than one kind of corn in the same garden at one time, as it will mix and deteriorate. Change your seed every two or three years, getting it, if possible, from a more northern latitude.

2. THE TOMATO—*Solanum Lycopersicum*.

This plant belongs to the same family as the potato, and, like that vegetable, is almost universally esteemed and cultivated. It is a native of South America. There are several sorts—yellow and red. The Large Smooth Red and the Pear-

Shaped are the best for table use; but the Large Red, a scoloped or indented variety, is preferred for marketing, as it grows much larger. The Large Yellow differs in flavor from the Red, and is preferred by some. It comes into use somewhat earlier than the other sorts. It is much used for preserves. The Red Cherry-Shaped and the Yellow Cherry-Shaped are beautiful varieties, much used for pickling and preserving.

A light, loamy, and moderately rich soil is best for the tomato. To have early tomatoes, the plants must be started in hot-beds in March. Sow the seeds thinly, or thin out the plants soon after they come up. As they advance in growth, they may be transplanted into a cold frame or walled pit, protected by glass, where they may stand three inches apart to harden for final transplanting into the open air; or they may remain in the hot-bed till settled warm weather—from the middle to the end of May in this latitude—when they may be planted out into a warm, sheltered situation in the open air.

Those who have no hot-bed or pit may very easily forward a few plants in a large pot or box of rich earth placed in the kitchen window, sowing the seeds in it from the middle of March to the first of April. Two or three weeks may be gained in this way over those planted in the open air.

For early tomatoes, we form conical hills, a foot or more in height, and three feet apart, with a little well-rotted manure in the center. Into a little crater-like excavation in the summits of these hills we set the plants, which should be taken up with a trowel in such a way as not to check their growth. A still better way is to sow the seeds in small pots, and in transplanting to transfer the whole ball of earth from the pot to the hill. The advantage of the elevated hills is, that the earth around the roots is more readily and thoroughly warmed by the heat of the sun. For a late crop, or for a hot, dry climate, this plan is not to be recommended.

In the South a plenty of tomatoes may be raised from self-sown seed, which will spring up in the garden, and require

little care; but if they are wanted earlier, the plants may be forwarded in a frame, or glass-covered boxes, sowing in February or the first of March, and transplanting when the frosts are over.

The earliest tomato plants should be shortened by taking off a few inches of their tops, so soon as they have set their first fruit, which will cause it to ripen more rapidly. Stir the soil frequently, and keep it free from weeds. Support the plants with branches or a little trellis, as you would peas, to keep the fruit from the ground. The plants, too, when supported, run less to vines, and are much more fruitful. One dozen plants properly supported will yield more and better fruit than three times that number will when allowed to rest on the ground.

3. THE EGG PLANT—*Solanum Melongena*.

This plant also, as may be seen by its botanical name, belongs to the potato family. It is a native of Africa. One of its varieties bears a white fruit resembling an egg, whence its name; but the purple varieties only are used in cookery. Of these the Large Prickley Purple produces the largest fruit, but the Long Purple is superior in flavor, and should be preferred for family use. They may be cultivated in the same way as tomatoes, but are rather more sensitive and tender. They may be sowed in April or the first of May in the open air, selecting a warm border, with a southern exposure.

The fruit is fit for use when two or three inches in diameter, and continues so till the seeds begin to change color. It is cut in thin slices, and fried, and is also sometimes used in stews and soups.

4. THE CAPE GOOSEBERRY—*Physalis Edulis*.

This is a newly-introduced annual plant, producing fruit of the size of a cherry, which is said to be excellent eaten raw or made into pies. We have not yet tested it. It is cultivated the same as the tomato.

5. THE PEPPER—*Capsicum Annum*.

The pepper is a tropical plant, but may easily be matured in the open air in this climate. It is better, however, to start the plants in a hot-bed, if practicable, and transplant in May or June. A warm situation and a light, rich soil suit it best. The plants should stand in rows eighteen inches apart, and a foot apart in the rows. Earth them up a little in cultivation. The Bell or Sweet is the best for pickling. The Cayenne is more used in its ripe state as a seasoning.

6. OKRA—*Hibiscus Esculentus*.

This vegetable, which belongs to the natural family of the cotton plant, was introduced from the West Indies, and is much cultivated in the Southern States. It is often called *gumbo* (Fr. *gombo*), and is used as an ingredient in stews and soups. It is cultivated to a considerable extent in New Jersey, and may be produced still farther north. A light, dry soil is best suited to it. Plant in drills three feet apart, scattering the seeds sparsely, and thin out to eighteen inches apart in the drill. It requires careful culture in a northern climate. Hoe very frequently, and keep the ground free from weeds. The pods must be gathered while quite green and tender. They may be cut into thin slices and dried for winter use.

7. RHUBARB—*Rheum Rhaponticum*.

Rhubarb, sometimes called pie-plant, although it has been cultivated to a small extent for centuries, and used for medicinal purposes, has not till quite recently been popularly appreciated. It certainly deserves a place in every garden. It is a native of Asia. Myatt's Victoria, Myatt's Linnæus, Buist's Early Red, and Downing's Colossal are all excellent varieties.

The soil for rhubarb should be a light loam, rich, and moderately moist. Bone-dust and guano are excellent special manures for it.

Rhubarb is propagated either by seeds or by division of the roots. The latter is, in ordinary cases, the preferable method.

From ten to twenty plants will be sufficient for a moderate family, and these may be had by dividing one or two good roots, leaving an eye on each set. The ground should be prepared in October, by spading it at least eighteen inches deep, digging in a large quantity of well-rotted manure, and breaking it up thoroughly in the process. Allow it to settle, and then plant out your sets two feet apart in the row, and four feet between the rows. The crowns or eyes of the sets should be about two inches below the surface, and should be immediately covered with four or five inches of litter, leaves, or straw, to prevent the frost from throwing them out during the winter. In this way a crop may be obtained the first year after planting. The only after-culture required is to cover the ground with a few inches of manure every fall, digging it in with a fork in the spring, and keeping the ground free from weeds. If you wish to raise it from the seed, sow in the spring, transplant in the fall, and treat as just directed. You will get new varieties. It will be ready for the table in three years.

To make the edible leaf-stems of your rhubarb grow long and tender, place barrels, pots, boxes, and so forth over them when they begin to grow in the spring; but the air and light should not be entirely excluded, unless you wish to obtain a very mild flavor.

Rhubarb may easily be forced by inverting boxes, pots, or half barrels over the plants in the autumn, and afterward covering the whole with leaves and hot stable manure. The boxes, etc., should be placed over the plants before the ground shall be frozen, covering the ground with eight or ten inches of litter. The mixture of leaves and manure may be applied about the middle of January or the first of February. By merely covering your plants with six or eight inches of litter, leaves, or almost any dry material, you may forward them from seven to ten days, without further trouble.

To gather, remove a little earth, and, bending down the leaf you would remove, slip it off from the crown without breaking or using the knife. The stalks are fit to use when the leaf is

half expanded. A larger, but inferior produce is obtained by letting them remain till in full expansion, as is practiced by the market-gardeners.

For use, peel the stem, and cut it into thin slices, and prepare as you would apples, for pies, tarts, or sauce. The English gardeners say, however, that it should be grown so quickly and be so tender as to require no peeling.

8. PARSLEY—*Apium Petroselinum*.

Parsley is but little cultivated in this country, and is principally used for garnishing. It is a native of Sardinia. The curled variety is most worthy of cultivation. Sow in April, in drills half an inch deep. It may form an edging around beds, borders, or compartments. From the long time the seed lies in the ground without germinating, it has been said that it goes nine times to the devil and back before it comes up! These journeys require ordinarily a month or more; but by soaking the seed twenty-four hours before sowing, the process is somewhat hastened. When the plants are three or four inches high, thin them out to six inches apart. With a little protection, it will grow all winter in this climate. It is esteemed by many as a seasoning for stews and soups.

XI.—SWEET HERBS, ETC.

Of the sweet herbs and medicinal plants more or less cultivated in gardens, a brief mention may properly be here made. They are generally planted in borders, and, to secure their peculiar virtues in perfection, should not be manured. Common garden soil is sufficiently rich for most of them. As a general rule, they are gathered when in bloom, and carefully dried in the shade.

1. *Shrubby Plants*.—Sage (*Salvia officinalis*); Winter Savoy (*Saturica montana*); Rosemary (*Rosmarius officinalis*); Thyme (*Thymus vulgaris*); Rue (*Ruta graveolens*); Wormwood (*Artimesia absinthium*); Southernwood (*Artimesia abrotanum*); Lavender (*Lavendula spica*); Hyssop (*Hyssopus officinalis*).

nalis). The foregoing are all propagated by dividing the roots or by cuttings, and require little cultivation.

2. *Perennial Herbaceous Plants*.—Peppermint (*Mentha piperita*); Spearmint (*Mentha viridis*); Pennyroyal (*Mentha pulegium*); Balm (*Melissa officinalis*); Tansy (*Tanacetum vulgare*); Burnet (*Poterium sanguisorba*); Chamomile (*Anthemis nobilis*); Elecampane (*Iluna helinium*); Fennel (*Anethum feniculum*); Thoroughwort or Boneset (*Eupatorium perfoliatum*); Liquorice (*Glycirriza glabra*). These are all increased by parting the roots.

3. *Biennial and Annual Plants*.—Caraway (*Carum carvi*); Coriander (*Coriandrum sativum*); Dill (*Anethum graveolens*); Anise (*Pimpinella anisum*); Sweet Marjoram (*Origanum majorana*); Summer Savory (*Satureja hortensis*); Sweet Basil (*Ocimum basilicum*); Bush Basil (*Ocimum minimum*); Angelica (*Angelica archangelica*); Borage (*Borago officinalis*); Horehound (*Marrubium vulgare*). All propagated by sowing the seeds.

VII.

THE FRUIT GARDEN.

But forward in the name of God, graffe, set, plant, and nourish up trees in every corner of your grounds, the labour is small, the cost is nothing, the commoditie is great, yourselves shall have plenty, the poore shall have somewhat in time of want to relieve their necessitie, and God shall reward your good mindes and diligence.—*Gerarde.*

I.—A HINT OR TWO.



HE lamented Downing says: "He who owns a rood of proper land in this country, and, in the face of the pomonal riches of the day, raises only crabs and choke-pears, deserves to lose the respect of all sensible men. Yet there are many in utter ignorance of most of the delicious fruits of modern days—who seem to live under some ban of expulsion from all the fair and goodly productions of the garden."

Such persons are still to be found, but their number is rapidly decreasing; and there are few who will not thoughtfully heed the quaint exhortation which we have chosen for the motto of this chapter.

After what we have said in our third and fifth chapters (which see), but few introductory hints will here be necessary. Let it be remembered that the plot set apart for the fruit garden should be thoroughly prepared before you commence planting; that the soil should be very deep (not less than two feet), and thoroughly broken up; that it must be moderately rich; that it should be well drained if the nature of the soil require it, and that a careful attention to the directions we have given under the heads of transplanting, budding, grafting, pruning, etc., are essential to success. Specific directions, when necessary, will be given under the name of each species.

The best manure for fruit-trees in general is composed of about equal parts of meadow mud, muck, or peaty earth, and common stable manure. A small quantity of wood-ashes, say four bushels to a cart-load of manure, and charcoal-dust in about the same ratio, may be intermixed with this composition to great advantage. This manure should be prepared and well worked over several months before using. Half a peck of bone-dust and a little lime, well mixed with the soil when setting the tree, or from a peck to a bushel of old broken bones, put into the bottom of the hole before setting, will be of great benefit for years. The general manuring of a fruit garden should be performed in autumn; and the holes for setting out the trees in the spring may be dug and filled with compost and earth at the same time with decided advantage. Rotted chips make an excellent manure for fruit-trees, and may be applied either in the holes or as a top-dressing.

Having set out your trees properly in well-prepared ground, the work is rightly *begun*—that is all. If you stop here, you might as well have never commenced—nay, better; for in that case you would have saved the cost of the trees and the labor of preparing the soil.

After your trees are planted, *it is absolutely essential that the ground around them shall be kept loose and mellow by cultivation.* Cultivate potatoes or some other low-growing crop between the rows of trees, keeping an area of more than the diameter of the head around each tree clear from both the crop and the weeds. So far as the tree's roots extend, the ground belongs to them, but it must be kept well stirred.

Newly transplanted trees sometimes, especially if the season be uncommonly dry, require watering; but a little water poured on the surface never reaches the roots, and, by causing the ground to bake, does more harm than good. To produce the desired result, take off a few inches of the surface above the roots, apply the water, and then replace the earth.

Mulching is exceedingly beneficial to young fruit-trees. A sufficient quantity of straw, litter, leaves, or tan-bark applied

in a circle covering the whole area of the roots will tend to retain the moisture, and render watering, in ordinary cases, unnecessary. In winter, where the climate is severe, it is still more useful, and often saves young trees from entire destruction by frost. A small space immediately about the trunk may be left uncovered, as it might harbor mice.

Every spring, wash the bodies of your young trees with soft soap, or one of the following preparations :

1. Dissolve one pound of potash in two gallons and one half of water, and then apply with a flat varnish-brush to the limbs and trunks of the trees. A varnish-brush is best, as the bristles are held together by tin bands on them, and not tied together with strings, as paint-brushes are, which the potash soon cuts through, and the brush falls to pieces.

2. Mix fresh cow-dung with urine and soap-suds, and with the mixture wash over the stems and branches of the trees as you would your room with whitewash, first cutting off the cankerous parts, and scraping the moss and rough bark off the trunks of the trees before applying it. This is particularly applicable to large and old trees. It will destroy the eggs of insects, and prevent moss growing on the trunks.

The following, it is said, will prevent rabbits [and probably mice] from girdling fruit-trees :

Make a solution of, say half a pound of tobacco to three gallons of water. Mix with clay, a little lime, a little fresh cow-dung, and an ounce or two of glue or paste. Thicken to the consistency of thick whitewash, and put on with a brush.

The following is Bridgeman's recipe for causing trees to thrive :

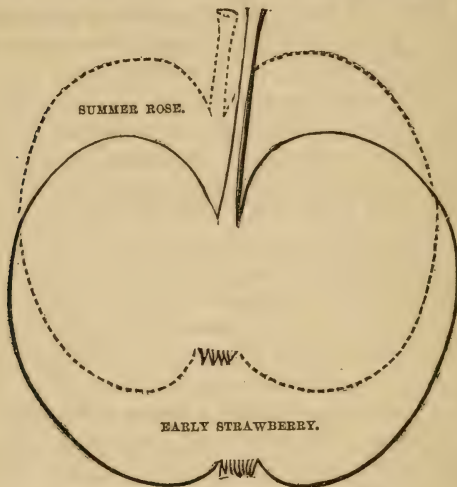
"The ground where they are planted must be kept well cultivated. Young trees will not thrive if the grass be permitted to form a sod around them; and if it should be necessary to plant them in grass grounds, care must be taken to keep the earth mellow and free from grass for three or four feet distant around them, and every autumn some well-rotted manure should be dug in around each tree, and every spring the bodies of the

trees washed or brushed over with common soft-soap, undiluted with water. This treatment will give a thriftiness to the trees, surpassing the expectation of any one who has not witnessed its effect."

II.—POMACEOUS FRUITS.

1. THE APPLE—*Pyrus Malus*.

All the varieties of the apple cultivated in this country have originated from the small, acid crab-apple of Europe. When



cultivated with the same care and skill, it seems to succeed even better here than in its native localities. It is well worthy to stand at the head of all the fruits of temperate climates.

The apple-tree requires so much room that, in an ordinary garden, we must confine ourselves to a small number. The choice of our varieties, then, becomes an important affair, and, we may add, a difficult one. 1. In the first place, the varieties are very numerous, being numbered by thousands; 2. Sorts which are considered "best" in one section of our widely ex-

tended country, often prove inferior or worthless in another; 3. Soil, seasons, and modes of cultivation modify them greatly in the same climate; 4. Many new and apparently excellent varieties have not yet been sufficiently tested in reference to their adaptation to general cultivation; 5. Tastes differ widely in reference to flavors; 6. Some sorts are known by from three to twenty different names—every neighborhood, almost, having its local appellation for them. This last circumstance creates great confusion, and renders our recommendation of varieties liable to be constantly misunderstood. The reader must make the necessary allowances, and modify our lists as the circumstances of his locality, soil, and climate, and his own experience and observation may dictate. None but the best should be allowed to occupy the limited space of a fruit garden; so we shall name only first-class apples, and our list of them will, of course, be far from complete:

SUMMER APPLES.

1. *Early Harvest*.—Above the medium size; shape round; skin smooth; bright straw color; flesh rich, sprightly, sub-acid. It begins to ripen about the first of July at the North. The finest early apple yet known. Succeeds well in all sections of the United States.

2. *Red Astrachan*.—Pretty large; roundish; brilliant crimson, with a bloom like a plum; crisp, sub-acid. Showy, and excellent for stewing. Ripens from the last of July to the middle of August. Succeeds in the Northern, Middle, and Western States.

3. *Large Yellow Bough*.—Middle size; oblong-ovate; smooth, greenish yellow; tender; crisp, rich; sweet. Ripens from the middle of July to the tenth of August. Succeeds everywhere. Sometimes known as the Early Sweet Bough.

4. *Carolina Red June*.—Medium size; oval; irregular; smooth, shaded with deep red, with a purplish hue on the sunny side, and covered with a light bloom; tender, juicy; briskly sub-acid. Ripens a few days later than the Early Harvest. Supposed to have originated in North Carolina. Succeeds best South and West.

5. *Summer Rose*.—Under the medium size; roundish, or slightly flattened; striped with red; tender; fine-grained; mild sub-acid. Ripens through the month of August. Pretty, excellent, and much esteemed for a dessert fruit. North and West.

6. *Bohannan*.—Large, roundish, flattened; fair, shining yellow, with a crimson cheek in the sun; flesh yellow; tender, juicy, with a fine, spicy,

sub-acid flavor. Ripens in July and August. Originated, we believe, in Kentucky. Succeeds finely South and West.

7. *Early Strawberry*.—Rather small; roundish; finely striped and stained with bright and dark red on a yellowish-white ground; tender, sub-acid, brisk, with an agreeable aroma. Northern, Middle, and Western States.

8. *Julian*.—Medium size; roundish, rather one-sided; yellowish-white, striped with carmine; tender, juicy, and fine-flavored. Southern, but succeeds well at the North. Ripens about the middle of July in Georgia.

9. *Golden Sweet*.—Above the medium size; roundish; well formed; straw color; very sweet and rich. The tree grows freely, and is a great bearer. August and September. Eastern.

10. *William's Favorite*.—Medium; oblong; a little one-sided; very smooth; light red ground, nearly covered with a fine dark red; mild and agreeable. It requires a strong, rich soil, and does not succeed in all localities. Ripens last of July. New England.

AUTUMN APPLES.

1. *Fall Pippin*.—Very large; roundish; generally a little flattened; smooth; yellowish-green; very tender, rich, aromatic. October to December. In the Middle States is considered the best of all the autumn apples. At the North it becomes a winter apple, and at the South, where it also succeeds well, a summer apple.* It is a universal favorite.

2. *Porter*.—Rather large; oblong; regular, narrowing to the eye; glossy, bright yellow, with a dull blush on the sunny side; fine-grained, juicy, rather acid. September. New England; but succeeds in all the Northern and Western States.

3. *Gravenstein*.—Large; a little flattened; slightly one-sided, broadest at the base; yellow, striped and marbled with deep red and orange; juicy, very rich, crisp, aromatic. September and October. A German apple, and one of the few European sorts that fully sustain their reputation here. Succeeds in the Northern, Middle, Western, and some of the Southern States.

4. *Rambo*.—Medium; flat; yellowish-white; striped and marbled rough red spots; mild but sprightly sub-acid. October to December. Originated in Pennsylvania. Very popular throughout the West.

5. *Pomme de Neige†*.—Medium; roundish; somewhat flattened; pale yellow ground, with faint streaks of pale red, becoming bright and deep on the sunny side; very tender; juicy; slightly perfumed. Ripens in October and November. A handsome dessert fruit. Canada. Very valuable for North.

6. *Bachelor*.—Very large; roundish; flattened a little, broader at the base; lemon yellow, tinged with lively red in the sun; fine-grained, juicy, very agreeable sub-acid. "A magnificent fruit." November. North Carolina. Very fine for most of the Southern States.

* It may here be added that all the autumn apples of the North become summer apples so far south as Georgia.

† Downing; the *Fameuse* of the Am. Pomological Society's List.

7. *Haskell Sweet*.—Large, or very large; flattish; greenish yellow, with a blush on the sunny side; tender, sweet, rich. Not widely proved. Succeeds admirably in Massachusetts and New York. September.

8. *Maiden's Blush*.—Medium; flat; smooth, fair, clear; lemon yellow, "with a colored cheek, sometimes delicately tinted, like a blush, and in others of a brilliant red;" tender, brisk, sub-acid. Excellent for cooking and drying. Both the tree and the fruit are very beautiful. From August to October. Origin New Jersey.

9. *Fall Queen of Kentucky*.—Large; oblate; slightly one-sided; yellow, striped and marbled with crimson, and sprinkled with brown and white dots; crisp, tender, juicy, brisk; mild sub-acid. Much esteemed at the South and Southwest. A winter apple at the North.

10. *Summer Sweet Paradise*.—Quite large; roundish; pale green, becoming yellowish; sweet, rich, aromatic. Very fine. The tree is an abundant bearer. August and September. Pennsylvania. Not widely proved.

WINTER APPLES.

1. *Newtown Pippin*.—Medium size; roundish; a little irregular; yellowish green, with a brownish blush on one side; juicy, crisp, fine-grained, high flavored, delicious. December to May. The best of all apples, whether native or foreign—acknowledged to be so in Europe. Succeeds well in New York and the Middle and Western States, but poorly in New England. The *Yellow Newtown Pippin* differs but slightly from the foregoing, but is rather hardier.

2. *Baldwin*.—Rather large; roundish; dull, yellowish red; rich, mild sub-acid. November to March. Massachusetts. The best of the New England apples. Succeeds well in many localities out of New England, but not in all. At the South it becomes a summer apple.

3. *Swaar*.—Above medium, roundish; rich yellow; fine-grained, tender, compact, very rich, mild, aromatic. December to March. New York. One of the finest-flavored of American apples. Does not succeed in damp, cold soils. Is successful in some parts of the West, but not generally in New England.

4. *Hubbardston Nonsuch*.—Large; roundish-oblong; yellowish ground, with pale and bright red stripes; tender, juicy, mild, very agreeable. October to January. New England.

5. *Yellow Belle-fleur*.—Large; oblong; irregular; pale lemon yellow, with a blush next the sun; tender, juicy, crisp, sprightly sub-acid. November to March. Succeeds in most of the Northern, Middle, and Western States, but fails in some localities. Called *Belle-fleur* (beautiful flower) from the beauty of its blossoms.

6. *Belmont*.—Medium or large; globular; yellow, often with a vermillion cheek; tender, juicy, sometimes almost melting; mild, agreeable. November to February. Ohio and the Middle States.

7. *Mangum*.—Medium; oblate; slightly conic; "yellowish, mostly striped and shaded with red, thickly sprinkled with whitish and bronze dots;" very

tender, juicy, mild, sub-acid; excellent. Southern. Ripens in October and November.

8. *Melon*.—Full medium; roundish, slightly conical; striped with red; very juicy; mild, sub-acid; spicy; very agreeable. Considered by many as the best of all table apples. October to March. Western New York.

9. *Pryor's Red*.—Rather large; roundish; irregular; dull brick red and russet; tender, mild, agreeable. January to March. Excellent for the West and South.

10. *Rhode Island Greening*.—Large; flattish; rich, greenish yellow when exposed; tender, rich, rather acid. Adapted to New York and New England.

11. *Equintely*.—Large; oblate, conic, angular, slightly oblique; whitish yellow, mostly overspread with a beautiful crimson, and thinly sprinkled with whitish dots; very tender, almost melting; juicy, mild, sub-acid; excellent. Southern. November to May.

12. *Westfield Seek-no-Further*.—Large, round; pale, dull red, over a clouded green ground; fine-grained, tender, spicy, rich. Very fine for all the Northern States. October to February.

13. *Lady Apple*.—Small, flat, regular; smooth, glassy, brilliant; deep-red cheek on a lemon-yellow ground; crisp, tender, very juicy, pleasant. Hardy and very beautiful. December to May.

14. *Roxbury Russet*.—Medium or large; roundish, a little flattened; dull green, covered with a brownish-yellow russet; moderately juicy, rather rich, sub-acid. An excellent keeper. Massachusetts. January to June. Does not succeed in all localities.

15. *Monmouth Pippin*.—Large, roundish, flat; smooth, russety-green, marked with dots; crisp, juicy, high-flavored. In use from November to March. New Jersey.

16. *Nakajack*.—Very large, flattened; yellowish green, striped and splashed with red, and sprinkled with minute white specks; juicy, tender, brisk, acid. North Carolina. One of the very best Southern winter apples.

17. *Cullasaga*.—Large, regular, slightly conical; yellow, with fine crimson stripes; pleasant, sub-acid, aromatic. Keeps well. North Carolina. Excellent for all the Southern States.

18. *Ortley*.—Medium to very large, ovate or conic; yellow, sometimes with a sunny cheek; tender, fine-grained, juicy, sub-acid, very pleasant. In use from November to February. Highly esteemed and very popular at the West. Does not succeed so well at the East.

19. *Golden Pippin*.—Large, oblate, globular; golden yellow, sprinkled with dots, and sometimes slightly netted with russet; tender, juicy, almost melting, rich, refreshing, vinous, aromatic. November to February. Best known in Westchester County, New York, where it is very popular. Hardy and productive.

20. *Esopus Spitzenberg*.—Large, oblong, tapering to the eye; rich, lively red, dotted with russet dots, and on the shady side a yellowish ground, with broken streaks of red; firm, crisp, juicy, rich, brisk, delicious. December to February. Unsurpassed as a dessert fruit. Does not succeed in all localities. New York.

21. *Ladies' Sweeting*.—Medium or large, roundish-ovate; bright red; crisp, tender, juicy, sweet, delicious, agreeably perfumed. Will keep till May. Downing considers it the finest winter sweet apple for the dessert yet known in this country. New York.

22. *Danvers' Winter Sweet*.—Above the medium, roundish, a little conical; light yellow, often with a handsome blush; sweet, rich. Good to bake. Keeps till April. Massachusetts. Succeeds in all the Northern and Middle States.

23. *Broadwell*.—Large, oblate, somewhat conic; greenish yellow, with a blush; tender, juicy, sweet, aromatic. November to March. Ohio. New, but excellent for the West and Southwest.

24. *Camak's Sweet*.—Medium to large, roundish, conical; whitish green, mottled with green russet, with a fine blush or red cheek toward the sun; firm, juicy, scarcely sweet, aromatic, fine flavored. In use from November to May. Southern. Origin, North Carolina.

25. *Dutchess County Sweeting*.—Large, or very large; bright yellow, with brown specks, and often with a bright blush on the sunny side; juicy, rich, tender, sugary. October to April. Dutchess County, New York. Seems to be a new variety. Charles Downing pronounces it one of the best of sweet apples.*

We must leave the reader to select from the foregoing forty-five varieties, and such others as he may add to them, the five or six or more sorts that he may require for a garden, hoping that he will find the task a less difficult one than we have found ours.

Of crab apples, the Siberian Red and the Siberian Yellow are the proper kinds for a garden. They are used for preserving. The Red makes a very ornamental tree.

Apple-trees should be planted thirty feet apart each way. As special manure, lime and ashes are indicated. About half a peck of each, applied annually to each tree, will be useful.

In common management, apple-trees in general bear only alternate years, which are called their bearing years; but by thinning out half the blossoms on the bearing year, you may easily have about an equal quantity of fruit every season. The bearing year may be entirely changed, by taking off all the blossoms or young fruit on that year, and allowing them to remain on the year which we wish to make the bearing one.

To preserve winter apples, gather them carefully by hand on

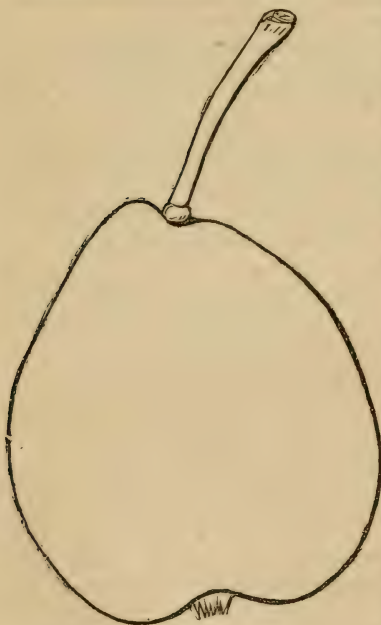
* Correspondent of *Country Gentleman*.

a dry day; lay them gently by hand twelve or fourteen inches deep on the floor of a cool, dry room, and let them dry and season there for three weeks. Then carefully take them up, on a clear day, and pack them by hand in clean, dry barrels, filling the barrels so full that a gentle pressure will be necessary in order to head them up.

Smaller quantities may be put up in common, tight, wooden buckets. The best place for keeping them is a dry, airy room or cellar, of which the temperature ranges from 35° to 45° Fahr.

Thomas recommends packing alternate layers of apples and

dry chaff mixed with a small portion of dry, pulverized lime. Apples for exportation are often wrapped each one separately in clean, soft, coarse paper, like oranges, and then put up in boxes or barrels, as above directed.



MADELEINE

2. THE PEAR—*Pyrus Communis*.

The pear is second only to the apple in general utility, and superior to that fruit in delicacy and flavor. The pear was cultivated so long ago as the earliest times of the Romans, but it is only in modern times that it has reached a

high degree of those delicious qualities for which it is now so much esteemed.

The task of selecting varieties of the pear is still more difficult than in the case of the apple. They are subject to greater variation under the influences of climate, soil, and culture, and the status of each sort is less easily determined. We shall make our list brief, admitting only well-tested sorts.

SUMMER PEARS.

1. *Madeleine*.—Medium size; yellowish green; juicy, delicate, slightly perfumed. Ripens from the middle to the last of July. Originated in France. Succeeds everywhere.

2. *Doyenne d'Été* (Summer Doyenne).—Small; yellow, shaded with bright red; juicy, melting, sweet, pleasant flavor. A little later than the *Madeleine*. France.

3. *Bloodgood*.—Medium; yellow-russet; buttery, melting, rich, sugary, highly aromatic, perfumed. August. The highest flavored of all the early pears. Long Island. Succeeds everywhere.

4. *Rostiezer*.—Scarcely medium; dull yellow, mixed with reddish-brown on the sunny side; buttery, very sugary; vinous, aromatic, perfumed. Middle of August. Foreign. Almost equal to the *Seckel* in flavor. Universally esteemed and successful.

5. *Dearborn's Seedling*.—Scarcely medium; light yellow; very juicy, melting, sweet and brisk in flavor. August. Massachusetts. Succeeds in all climates.

6. *Julienne*.—Small; clear, bright yellow; half buttery, sweet, moderately juicy. August. Foreign (?). Very productive. Requires warm, dry soils. Succeeds best at the South.

AUTUMN PEARS.

1. *Bartlett*.—Large; clear yellow, with a blush on the sunny side; fine-grained, buttery, juicy, sweet, vinous, highly perfumed. August and September. England. A noble fruit, and has no competitor in the market at its season. Belongs both to the summer and autumn lists.

2. *Seckel*.—Small; yellowish-brown, with a russety red cheek; very juicy and melting, with a peculiarly rich, spicy flavor and aroma. It ripens gradually in the house from the end of August to the last of October. American. For flavor, it stands at the head of all pears, whether native or foreign.

3. *Fondante d'Automne* (Belle Lucrative).—Medium, yellowish-green, slightly russeted; exceedingly juicy, melting, sugary, rich, and delicious. Last of September. Belgium. Scarcely inferior to the *Seckel* in flavor. Does not succeed in all localities and seasons. Excellent in the South.

4. *Urbaniste*.—Medium; pale yellow, with gray dots; juicy, melting, delicious, delicately perfumed. October; will keep till December in the house. Belgium. Especially adapted to the Middle States.

5. *Flemish Beauty*.—Large; reddish-brown russet; juicy, melting, sweet,

rich, excellent. Last of September. Belgium. Should be picked before fully mature, and ripened in the house. Does not succeed in all localities.

6. *Dié*.—Large; deep yellow, with russet dots; juicy, melting, rich, sugary, slightly perfumed. Massachusetts. October and November. American.

7.—*Louise Bonne de Jersey*.—Large; pale green, with a brownish-red blush; very juicy and melting, rich, excellent. Not the very best in point of flavor, but very hardy and productive. Excellent for cooking. Succeeds best on the quince. France. Ripens in September and October.

8. *Beurre Bosc*.—Large; dark yellow, with cinnamon russet streaks and dots; melting, very buttery, rich, delicious, perfumed. September and October. Belgium.

9. *White Doyenné* (Virgalieu).—Medium or large; pale yellow, sprinkled with dots; melting, buttery, rich, high flavored, delicious. September. France. Does not succeed in all localities.

10. *Gray Doyenné*.—Medium; cinnamon russet; resembles the White Doyenné in flavor. October. A good keeper. France.

WINTER PEARS.

1. *Winter Nellis*.—Medium; yellowish-green, dotted and streaked with russet; very juicy, fine-grained, melting, buttery, rich, sugary, aromatic, delicious. Keeps till the middle of January. Almost equal to the Seckel in flavor. Belgium. Succeeds everywhere.

2. *Lawrence*.—Medium or large; lemon-yellow, with brown dots; somewhat buttery; rich, aromatic, excellent. Early winter. Long Island. Succeeds everywhere.

3. *East's Beurré*.—Large; yellowish-green; juicy, buttery, sweet, rich, delicious. Keeps till spring. It requires high culture and a warm situation at the North. Succeeds best at the South. Foreign.

4. *Glou-Moreau**.—Rather large; greenish-yellow; fine-grained, melting, buttery, rich, sugary. December. Belgium. Does not succeed in heavy, cold soils. Excellent at the South.

5. *Vicar of Winkfield*.—Large, long; pale yellow; juicy, sometimes buttery; good, sprightly flavor. November to January. France. Only second-rate for the table, but most excellent for cooking. Very hardy and productive.

6. *Prince's St. Germain*.—Medium; brownish-russet over a green ground, becoming red next the sun; melting, juicy, sweet, somewhat vinous, very agreeable. Will keep till March. Long Island.

The best soil for the pear is a strong loam on a *dry* subsoil. It requires the same manure as the apple, with the addition of a larger quantity of ashes or potash in some other form. Set standard trees twenty feet apart each way; dwarfs from ten to

* Downing; the *Beurre d'Aremberg* of the French, and so named in the lists of the American Pomological Society.

twelve. Give bearing trees a moderate top-dressing of manure every autumn. Pear-trees require comparatively little pruning.

To dwarf the pear, it is grafted on Anger's quince stocks. The fruit produced by trees thus grafted is usually better than that of those on the pear stock. They also come into bearing sooner, and take up less room in the garden; but they are not so long-lived as on the pear. Quince-bottomed pear-trees must be very carefully cultivated. They will not bear neglect. They should be headed-in more or less every year.

Winter pears are all necessarily ripened in the house; and nearly all summer pears, and a very large proportion of the autumn varieties, are greatly improved by ripening them in the house also. As a general rule, take summer and early autumn pears from the trees, just when some of the earlier full-grown specimens begin to ripen. Gather them carefully by hand in a dry day, spread them on the shelves of your *fruit-room*, or upon the floor of a cool, dry chamber. Here they will ripen by degrees, and without further care.

Late autumn and winter pears should also be gathered very carefully by hand, in dry weather. Put them away very carefully, so as not to bruise or indent them in the least, in tight, clean wooden boxes, buckets, or barrels, and keep them in a cool, dry, airy room or cellar, of which the temperature shall be from about 38° to 45° Fahr. Examine them occasionally, and if they should be sweating, take them out carefully, and dry them on the floor, removing any that may have begun to decay, and re-packing them as before. About ten days before their usual time of ripening, bring them into a warm room. The result of this process will surprise, as well as gratify, one who has never tried it.

3. THE QUINCE—*Cydonia Vulgaris*.

This tree is a native of Germany. It was cultivated, and its fruit much esteemed by the Greeks and Romans. It was used by them, as by the moderns, for preserving. There are only two varieties deserving of culture.

1. *The Apple-Shaped* (Orange Quince).—Large, roundish, shaped like an apple; a fine golden color; stew tender; flavor excellent.

2. *Portugal*.—Very large, oblong; color not so deep as the foregoing; very fine flavor. The flesh turns purple or a deep crimson when cooked. It is superior to the Apple-Shaped, but less productive.

The quince is easily propagated from seeds, layers, or cuttings. A moist, strong soil suits the quince, as it grows naturally along the borders of streams. Set the trees ten feet apart, and give them the same cultivation as the apple and the pear. Little pruning is required, except to improve the form of the head.

III.—STONE FRUITS.

1. THE PEACH—*Persica Vulgaris*.

The peach derives its name from Persia (It. *persica*, Fr. *pêcher*), from which country it originated. It is now cultivated to a greater extent in the United States than in any other country in the world. In its perfection, it does not yield the palm to any other fruit. A Seckel would hardly tempt us to lay aside a Rareripe.

The varieties of the peach are very numerous. The few we name are all of a very high order of merit. We place them so nearly as possible in the order of their ripening:

FREESTONE PEACHES.

1. *Early Tillotson*.—Medium size; red; juicy, rich, high flavored. Does not succeed in all localities at the North. Excellent generally at the South. Originated in New York.

2. *Columbus June*.—Medium; yellowish-white; high flavored; excellent. Southern.

3. *Early York*.—Medium; pale red; tender, melting, juicy. A universal favorite. England.

4. *Early Newington Freestone*.—Large; pale yellowish-white; juicy, melting, vinous. Without a superior at its season. American.

5. *Grosse Mignonne*.—Large; pale greenish-yellow; rich, vinous, high flavored. World-renowned and excellent everywhere. France.

6. *Cooledge's Favorite*.—Medium; red; juicy, rich, sweet, high flavored. Popular in New England. Very valuable for the North.

7. *George the Fourth*.—Large; pale yellowish-white; melting, very juicy remarkably rich, delicious. The very best in its season. Succeeds everywhere. New York.

8. *White Imperial*.—Rather large; yellowish-white; delicate, sweet, juicy, delicious. Fine at the North. New York.

9. *Brevoort*.—Medium to large; yellowish-white; rich, sugary, high flavored. Excellent in nearly all localities. New York.

10. *Crawford's Early*.—Very large; yellow; yellow-fleshed; melting, rich, sweet; very excellent. Universally esteemed, and successful everywhere.

11. *Bergen Yellow*.—Very large; deep orange, with red dots; flesh yellow, juicy, melting, rich, luscious. Long Island.

12. *Red Rareripe*.—Rather large; white, mottled with red—cheek dark, rich red; very rich and high flavored. Very fine. American.

13. *Morris White*.—Rather large; pale, creamy white; juicy, sweet, and rich. A favorite sort in the Middle States; not so good at the North. Pennsylvania.

14. *Noblesse*.—Large; pale green, marked on the cheek with delicate red, clouded with darker red; very juicy and very highly flavored; luscious. Originated in England.

15. *Oldmixon Freestone*.—Large; yellowish, marbled with red, and a deep red cheek; rich, sugary, vinous. American.

16. *Late Red Rareripe*.—Large; grayish-yellow, thickly marbled with reddish spots, and with a dull-red cheek; luscious and high flavored. Unsurpassed at its season; a universal favorite. American.

17. *Druid Hill*.—Large; pale greenish-white, clouded with red on the sunny side; exceedingly rich and high flavored. One of the best of the late varieties. Maryland.

18. *Crawford's Late*.—Very large; deep yellow, with a red cheek; rich and juicy. Succeeds everywhere. New Jersey.

19. *Henry Clay*.—Very large; deep purple in the sun, shading to bright pink and creamy white; delicate, tender; flavor peculiar, partaking slightly of the pineapple and the strawberry. Mississippi.

20. *Late Admirable*.—Very large; pale yellowish-green, with a pale red cheek; very juicy, melting, and of a delicate, exquisite flavor. Everywhere successful and excellent. France.

OLINGSTONES.

1. *Oldmixon Cling*.—Large; yellowish-white, with a dotted red cheek; juicy, rich, excellent. Should have a place in every garden North and South. Origin, England.

2. *Large White Clingstone*.—Large; white, dotted with red on the sunny side; very juicy, tender, and luscious; high flavored. Next to the preceding in value. New York.

3. *Heath*.—Very large; creamy white, with a faint blush of red on the sunny side; tender, melting, very juicy, with the richest, highest, and most luscious flavor. Where it will succeed, the best of all the clingstone peaches. Will seldom ripen in New England. Succeeds well in Southern New York and the Middle and Southern States. Maryland.

4. *Horton's Delicious*.—Large; creamy white, with a faint blush toward the sun; flavor like the Heath. New, but excellent. Georgia.

5. *Lemon Clingstone*.—Large; fine yellow, with a brownish, red cheek; rich, sprightly, vinous, sub-acid; flesh yellow. Best of the yellow-fleshed clings. South Carolina.

Set peach-trees about sixteen feet apart each way. Bone-dust and wood-ashes are the special manures most likely to be serviceable to them.

The peach is somewhat dwarfed and rendered hardier in a northern climate by grafting on a plum stock. It requires but little pruning, except "shortening-in," which should be done early in the spring every year so long as the tree lives. Cut off half the last year's growth over the whole outside of the tree. This method will increase the size and value of the fruit, and cause the tree to live and continue in bearing several years longer than under the old system.

Every one who cultivates peaches should preserve a quantity for winter use, either in air-tight cans or by drying.

2. THE NECTARINE—*Persica Vulgaris Lævis*.

The nectarine is only a distinct accidental variety of the peach with a smooth skin. The well-known Boston nectarine originated from a peach-stone. Soil, manure, and culture are the same as for the peach. It is a beautiful fruit, but, on account of its liability to be destroyed by the curculio, is little cultivated. Good crops are rare.

1. *Hunt's Tawny*.—Medium; pale orange, with a dark red cheek; very good. The best early variety. England.

2. *Violet Hâtive* (Early Violet).—Rather large; pale, yellowish-green in the shade, but when exposed of a dark, purplish red; very rich and highly flavored. The best of all nectarines. France.

3. *Elruge*.—Medium; purplish red, like the Violet Hâtive, but may be readily distinguished from the latter by the pale color of its stone; rich and high flavored. Excellent. England.

4. *Downton*.—Intermediate between the Violet Hâtive and the Elruge. Very good.

5. *Stanwick*.—A new and highly extolled variety from England. Requires hot-house culture at the North. Will probably be found adapted to the South.

3. THE APRICOT—*Armeniaca Vulgaris*.

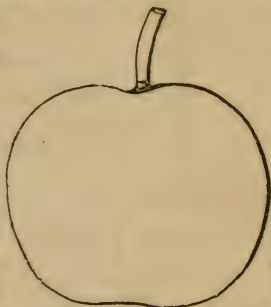
The apricot is a native of central Asia, and is the most beautiful of all the stone fruits. It ripens about midsummer, or immediately after the cherries. In this country it may be cultivated in the open air, in almost any locality south of Massachusetts. Like the nectarine, it is very liable to be destroyed by the curculio. Let the poultry or pigs have access to the trees when the fruit begins to drop.

The apricot is generally budded on the plum stock. It should be placed on a north, east, or west aspect, and be protected by a wall or fence. It requires no pruning. The best varieties are the Large Early, Early Golden, Breda, Moorpark, and Hemshirke.

4. THE PLUM—*Prunus Domestica*.

Several varieties of the plum are found growing wild in this country, but the original parent of most of our cultivated sorts is supposed to have been brought from Asia. The varieties are numerous.

The Green Gage, an old English plum, still keeps its place, in popular estimation, at the head of the list; but for a single variety, we should choose the Jefferson. The following is Downing's selection of choice varieties:



GREEN-GAGE PLUM.

1. *Rivers' Early Favorite*.—First of August. Foreign.
2. *Green Gage*.—Middle of August. Foreign.
3. *Imperial Ottoman*.—Last of July. Foreign.
4. *Jefferson* (the plum of plums).—Last of August. American.
5. *Lawrence's Favorite*.—Middle of August. American.
6. *Purple Favorite*.—August. American.
7. *Purple Gage*.—September. Foreign.
8. *Coe's Golden Drop*.—Last of September. Foreign.
9. *McLaughlin*.—Last of August. American.
10. *Imperial Gage*.—First of September. American.
11. *Howard's Favorite*.—September. American.

12. *Prince's Yellow Gage*.—First of August. American.
13. *Prune d'Angen*.—Last of September. Foreign.
14. *Reine Claude de Bevey*.—September. Foreign.
15. *Schuyler Gage*.—Last of September. American.

The best soil for the plum is a strong loam on a dry subsoil; but it will grow in any tolerably fertile soil. An annual top-dressing of common salt will be found very useful, not only promoting the growth of the tree, but driving away most of the insects to which it is liable. The trees should be set about sixteen feet apart each way. The great enemy of the plum is the curculio, against which you must wage a war of extermination.

The plum is generally propagated by budding, but may be grafted with success, if the operation be skillfully and carefully performed. Little pruning is necessary, except when the tree is young, to improve the form of the head.



OHIO BEAUTY.

5. THE CHERRY—*Cerasus Sylvestris et C. Vulgaris*.

The cherry was brought originally from Asia by the Roman general Lucullus, and has been in cultivation in Europe for more than eighteen hundred years. It was introduced into America on the first settlement of the country. There are more than a hundred varieties. We submit the following selection of choice sorts, which we name nearly in the order of ripening.

HEART AND BIGARREAU CHERRIES.

1. *Early Purple Guigne*.—Color nearly black; juicy; sweet; very early.
2. *Belle d'Orleans* (French).—Pale red; excellent.
3. *Governor Wood*.—Light red; fine flavored.
4. *Coe's Transparent*.—Pale reddish-amber; sweet.
5. *Knight's Early Black*.—Rich and high flavored.
6. *Bigarreau*.—Pale whitish yellow; rich, sweet, delicious.

* Yellow Spanish or Graffion of most American gardens.

7. *Elton*.—Yellow, marked with red ; high flavored.
8. *Delicate*.—Amber yellow, with a red cheek ; rich and sweet.
9. *Downton*.—Light yellow ; delicious.
10. *Downer's Late*.—Soft, lively red ; melting, luscious.

DUKE AND MORELLO CHERRIES.

1. *May Duke*.—Nearly black ; rich, acid ; very hardy ; best of its kind.
2. *Belle de Choisy*.—Yellowish red ; delicate, sub-acid.
3. *Kentish*.—Bright red ; rich, brisk, acid ; very hardy.
4. *Reine Hortense*.—Bright red, marbled ; like the May Duke in flavor.
5. *Belle Magnifique*.—Bright red ; juicy, brisk, sub-acid.

The Dukes and Morellos are hardier than the Hearts and Bigarreaus, and succeed better in both extremes of climate—North and South. Next to these are the Early Purple Guigne, Elton, and Downer's Late.

All sorts of cherries are generally worked on Black Mazzard stocks. They may be either budded or grafted. Set the trees from sixteen to twenty feet apart, and cultivate the same as the plum.

6. THE OLIVE—*Olea Europea*.

The olive should be more widely cultivated in the Southern States. The seaboard States of the South are well adapted to its culture. It will thrive farther north than the orange. It is a low ever-green tree, and commences bearing in five or six years after being planted. The oil is made by crushing the fruit to a paste, and pressing it through a coarse, hempen bag, into hot water, from the surface of which the oil is skimmed off. The common European olive is the best variety for general cultivation. It is propagated by means of little knots or tumors, which form on the bark of the trunk, and are easily cut out with a penknife. These are planted in the soil like bulbs. It may also be propagated by cuttings or seeds.



OLIVE BRANCH AND FRUIT.

IV.—THE ORANGE FAMILY.

1. THE ORANGE—*Citrus Aurantium*.

This delicious tropical fruit is successfully cultivated in Florida, and to some extent in Louisiana, Texas, Georgia, South Carolina, and other Southern States. With only slight protection, it will succeed so far north as Baltimore. Of the sweet orange, which alone is worthy of garden cultivation, the best varieties are the Havana or Common Sweet, the Maltese, the Blood Red, the Mandarin, and the St. Michael.

The orange requires a deep, rich loam. To procure stocks for budding with the sweet varieties, sow early in the spring the seeds of the wild, bitter orange of Florida. They may be budded the same or the next season.

The great foe of the orange-tree is the scale insect (*Coccus Hesperidum*), but the common chamomile is found to be a specific against it. This herb, in bunches, hung on the branches of the trees, drives it away, and by cultivating the plant about the roots of the tree, it is protected against its attacks.

2. THE LEMON—*Citrus Limonum*.

The lemon is cultivated like the orange. Besides the common lemon, there is an Italian variety called the Sweet Lemon. The lime, the citron, and the shaddock belong to the same family, and are subject to the same culture.



ISABELLA.

V.—THE BERRIED FRUITS.

1. THE GRAPE—*Vitis* of species.

The grape should undoubtedly head the list of berried fruits. It has been cultivated from the earliest ages, and in almost every country in the temperate zones. The varieties cultivated in Europe are all of one species (*Vitis vinifera*), and originated in Asia. Our native grapes are of different species.

The foreign grapes do not succeed in this country in open-air culture. The Black Burgundy and the Sherry may perhaps be considered as partial exceptions at the South. Under glass they may be successfully cultivated in all parts of the United States; but as our plan does not embrace hot-house cultivation, we must refer the reader to Chorlton's "Grape Grower's Guide," and other works devoted specially to grape culture. Our list will embrace only native sorts.

1. *Isabella*.—Bunches of good size; berries oval, rather large; skin nearly black, covered with a blue bloom; flesh tender, juicy, sweet, rich; slightly musky. Hardy and productive. Origin, South Carolina. Succeeds everywhere.

2. *Catawba*.—Bunches medium; berries pretty large, round, or slightly oval; pale red in the shade, but deep red next the sun, with a lilac bloom; juicy, sweet, rich, musky, aromatic. Hardy, productive, and succeeds in all localities adapted to grape culture. Maryland.

3. *Diana*.—Resembles the Catawba, of which it is a seedling, but is earlier and more beautiful. Color a fine reddish lilac, covered with bloom; juicy, vinous, aromatic. It originated in Massachusetts, but succeeds even better at the South than at the North.

4. *Rebecca*.—Branches cylindric, very compact, heavy; berries full medium, oval; light green in the shade, auburn or golden toward the sun, and covered with a light bloom; juicy, sweet, delicious. It ripens ten days earlier than the Isabella, and keeps well. Hardy and productive. New. Has not been extensively proved. New York.

5. *Scuppernong*.—Bunches small, loose; berries large, round; juicy and sweet; very musky. Found growing wild from Virginia to Florida. It is a distinct species, quite unlike the other cultivated sorts. Excellent at the South. Does not succeed north of Virginia.

6. *Concord*.—Bunch large, compact; berries large, globular; almost black, thickly covered with bloom; sweet and juicy. Hardier and earlier than the Isabella, but not quite equal to the latter in flavor. Best for the most northern range of the grape.

7. *Herbemont*.—Bunch very large, compact, shouldered; berries below medium, round; dark blue, or violet, with a thick, light bloom; skin thin, and filled with a sweet, rich, vinous, aromatic juice, of so little consistence that it can hardly be called flesh. In favorable localities, one of the best of our native grapes. North of Philadelphia it succeeds only in warm exposures and favorable seasons. It is probably of Southern origin.

Were we to add to the foregoing list, we should name the Delaware, the Bland, and the To-Kalon, all good varieties.

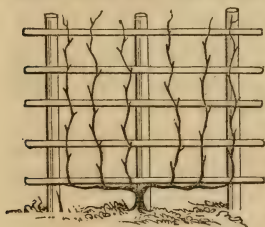
The grape will succeed in most soils, if properly prepared;

but dry, rich loam is preferable. It must be deeply worked, and, if at all wet, thoroughly underdrained. Lime, ashes, plaster of Paris, and bone-dust may be added to the common compost, or used as a top-dressing with great advantage. Choose a warm, sunny exposure for your grapery. In the shade the fruit is liable to mildew.

All the varieties of the native grape are very readily propagated by means of layering, and most of them will grow from cuttings. Cuttings—unless struck where they are to remain, which is the better plan—should be left where they are started for two years before planting out. Layers may be planted out the first year. Set the plants from twelve to twenty feet apart, according to the height of the trellis and the mode of training to be adopted. When planted, cut them down to about two eyes from the ground, and allow only one of these to grow the following season.

In garden culture, grapevines are trained in various ways, as fancy or convenience may dictate. Downing directs as follows:

“The two buds left on the set are allowed to form two upright shoots the next summer, which at the end of the season



TRAINING.

are brought down to a horizontal position, and fastened each way to the lower horizontal rail of the trellis, being shortened to three or four feet, or such a distance each way as it is wished to have the plant extend. The next year upright shoots are allowed to grow one foot apart; and these are

stopped at the top of the trellis. The third year, the trellis being filled with vines, a set of lateral shoots will be produced from the upright leaders, with from one to three bunches on each. The vine is now perfect, and it is only necessary at the autumnal or winter pruning to cut back the lateral shoots or fruit spurs to within an inch of the uprights, and new laterals producing fruit will annually supply their places. If it should

be found after several years bearing that the grapes fail in size or flavor, the vines should be cut down to the main horizontal shoots at the bottom of the trellis. New uprights will be produced, which treat as before.

This is the way to have good crops of perfect grapes. If you desire wood and leaves instead, less pruning will do. The annual pruning should be performed either in November, in February, or early in March—at least a month before vegetation commences. All the other pruning required may be performed with the fingers or a pair of scissors. Only two bunches should be allowed to grow on one shoot; and the end of the shoot should be pinched off, four or five joints beyond the last of these, when the grapes are about half grown. All suckers and supernumerary shoots should be rubbed off so soon as they appear. Beyond this, no leaves must be removed, as they are absolutely essential to the full development and ripening of the fruit. Every third year, at least, the borders where the grapevines are growing should have a heavy top-dressing of manure.

Grapes may be preserved for a considerable time by taking the ripe bunches when free from external moisture, and packing them in jars, filling all the interstices with baked saw-dust or bran.

2. THE CURRANT—*Ribes Rubum*.

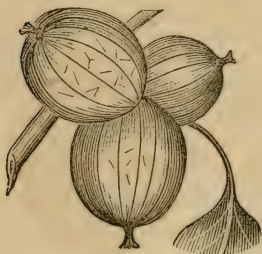
The currant is supposed to be a native of the north of Europe. There are several varieties, of which the best are Red Dutch, White Dutch, and Knight's Sweet Red.

Of the black currant (*ribes nigrum*), the only sort worthy of cultivation is the Black Naples.

The currant is more easily cultivated than any other fruit. The best mode of propagating it is by planting out cuttings in the fall, or quite early in the spring. It is well to procure the cuttings in the fall, and keep them like scions until spring. By taking out all the eyes of a cutting except the three or four upper ones, currants can easily be kept in the form of little trees.

3. THE GOOSEBERRY—*Ribes Grossularia*.

The gooseberry requires a deep, strong, rich soil. It is very liable to suffer from drouth, and in dry seasons should be mulched. It is rather shy of bearing in this country, and does not succeed in all localities, even at the North. At the South it is nearly useless, in ordinary localities, to attempt its culture.



HOUGHTON'S SEEDLING.

The tree form is best for the gooseberry; and one half of the top should be thinned out at the winter pruning, so as to admit light and air through the head of

the plant. When the berries are fairly set, thin them out, taking away one half or more of them for the benefit of the rest. The best preventive and remedy for mildew is to keep the plants well manured and pruned every year.

Of the numberless varieties cultivated, the following are among the best:

WHITE.

Woodward's Whitesmith,
Freedom,
Taylor's Bright Venus,
Sheba Queen.

YELLOW.

Leader,
Yellow Ball,
Catherine,
Gunner.

GREEN.

Green Gage,
Green Walnut,
Parkinson's Laurel
Thumper.

RED.

Crown Bob,
Warrington,
London,
Houghton's Seedling.

4. THE RASPBERRY—*Rubus Idæus*.

This is a delicious fruit, even in its wild state, and has been much improved by cultivation. The following sorts are all desirable:

Red Antwerp,
Orange,

American Red,
American Black,

Fastolf,
Franconia,

Ohio Everbearing,
Merveille de Quatre Saisons.

The grand merit of the Ohio Everbearing is its property of bearing till late in the season. In other respects it is precisely like the American Black (common thimbleberry). The Merveille de Quatre Saisons, a French variety, is an autumnal raspberry. The foreign varieties do not, in general, succeed at the South. The American Black seems to do best there.



RED ANTWERP.

A deep, rich loam, rather moist than dry, suits the raspberry best. It is propagated by suckers or offsets. Plant in a sunny quarter of the garden, in rows from three to four feet apart each way. Three or four suckers may be planted together to form a group. This should be done in the autumn or very early in the spring.

All dead wood and the smaller stems should be cut away in the spring, even with the ground. Four or five shoots should be left, and tied to a stake, the tops having about one foot of their upper extremities headed off. A slight top-dressing of manure, with a sprinkling of salt, dug in every spring, is all the further cultivation required.

The raspberry plant is in perfection when it is three years old. When it is about six years old, it should be dug up, and a new plantation made, on a piece of ground where the plant has not recently grown before. It is an excellent mode to make a small plantation every year, so as to continue a supply of the fruit. In extreme cold latitudes, it is necessary to bend the plants down, and cover them with earth or straw through the winter.

To have a fine crop of late raspberries, cut down some of the canes or stems, in the spring, to within a few inches of the ground. The new shoots which will spring up will come into bearing in August or September.

5. BLACKBERRY—*Rebus* of species.

The low blackberry or dewberry (*rebus Canadensis*) has never, we believe, been cultivated, but the fruit, when well exposed to the sun and fully ripened, is sweet, high flavored, and not to be despised. It is also doubtless susceptible of improvement. Of the high blackberry (*rebus villosus*), the following improved varieties are highly esteemed, and the first two much cultivated.

1. *New Rochelle*.—Very large; intensely black; juicy; rather soft, sweet, excellent flavor. Ripens the first of August, and continues in use six weeks. Originated at New Rochelle, N. Y.

2. *Dorchester*.—Nearly equal in size to the foregoing, but of a more elongated form. Very sweet and high flavored. Vigorous and productive. Ripens about the first of August. Bears carriage well. Originated in Massachusetts.

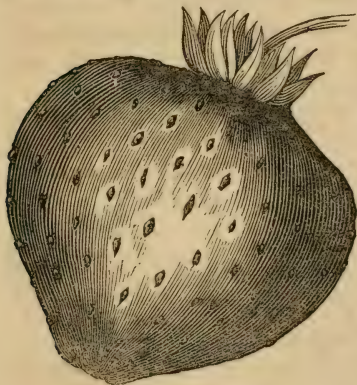
3. *Newman's Thornless*.—Promises to be valuable. Not so well tested as the others. New York.

The blackberry requires similar culture to the raspberry.

6. THE STRAWBERRY—*Fragaria*.

This is the queen of all berries—delicious, wholesome, and universally esteemed. It is a native of the temperate latitudes of Asia, Europe, and America. The best varieties now cultivated in this country have originated from native species—the Scarlets and the Pines.

In its wild or natural state, the strawberry generally produces hermaphrodite or perfect blossoms. Cultivated varieties have not all retained this property. They are properly di-



HOVEY'S SEEDLING.

vided, with reference to their blossoms, into three classes—

hermaphrodite, staminate, and pistillate. Varieties of the first class are, like the wild plants, perfect in themselves, and bear excellent crops. In the second class, the staminate or male



Hermaphrodite.

Staminate.

Pistillate.

STRAWBERRY BLOSSOMS.

organs are perfect, but the female or pistillate organs are more or less imperfect. They bear uncertain and comparatively small crops, because only a part of the blossoms develop the pistils sufficiently to swell into perfect fruit. Plants of the third class bear only pistillate or female blossoms, and are by themselves entirely barren; but when grown near a proper number of the staminate plants, they bear the largest crops and the most perfect berries. In planting a strawberry bed, therefore, it is important to know which are staminate, which pistillate, and which hermaphrodite varieties, and to arrange them accordingly. We shall carefully mark the three classes in our lists of sorts. From varieties almost numberless, we make the following selection:

PINES AND SCARLETS.

1. *Hovey's Seedling*.—Very large and highly flavored. Succeeds everywhere. Originated in Massachusetts. Pistillate.

2. *Large Early Scarlet*.—Medium; sprightly, sub-acid. Very early. Popular in all sections of the country. Staminate.

3. *Jenny's Seedling*.—Large and excellent for market and preserving. Staminate.

4. *Boston Pine*.—Rather large, and very beautiful. Early. Requires a deep, rich soil, and should be cultivated in hills or bunches. Does not succeed in all localities. Pistillate.

5. *Burr's New Pine*.—A very excellent variety for some localities, but does not withstand extremes of heat or cold. Requires high cultivation and great care, which it well repays in favorable localities. Pistillate.

6. *Longworth's Prolific*.—Large, vigorous, and very productive; rich, acid. Hermaphrodite.

7. *Crimson Cone*.—Old and well known; late; excellent for preserving. Pistillate.

8. *McAvoy's Superior*.—Truly superior at Cincinnati, where it originated. Has not fully sustained its reputation at the East.

ALPINE AND WOOD STRAWBERRIES.

1. *Red Wood*.—This is the wild strawberry of Europe. Easy of cultivation, and one of the most desirable kinds. Sweet and delicate, but small. Flowers always hermaphrodite or perfect. The White Wood is similar, except in color.

2. *Red Alpine*.—The French call this *Des Alpes de Tous les Mois*, signifying that it bears every month. It really continues in bearing from June to November, and a fine autumn crop may be insured by cutting off the spring blossoms. Resembles the Red Wood. Flowers always perfect.*

3. *Red Bush Alpine*.—This grows in compact bunches, and is remarkable for its entire destitution of runners. It makes a fine edging for beds. Bears abundantly through the season. One of the most desirable sorts. Propagated by dividing the roots. Hermaphrodite.

HAUTBOIS STRAWBERRIES.†

1. *Peabody's New Hautbois*.—Very large, and very sweet, melting, and juicy, with a pineapple flavor. A new sort of the highest promise, originated by Chas. A. Peabody, of Columbus, Ga. Has not yet been well proved at the North. Hermaphrodite or perfect flowered.

2. *Prolific or Conical*.—Large; dark-colored, very rich, and high flavored; slightly musky. A very excellent sort. Hermaphrodite.

Form your strawberry bed in an open exposure, free from the shade of trees or buildings. For an early crop, a slight inclination to the south or east is desirable. The ground must be deeply spaded, and a plenty of decomposed leaves and other *vegetable manure* and ashes well turned under and mixed with the soil. Pulverize the soil thoroughly. Now mark off your bed into rows two feet apart, and set the plants, if of the large

* Geo. M. Caldwell, of St. Albans, Vt., describes, in a communication now before us, an ever-bearing strawberry cultivated by him, the origin of which he does not know. He says:

"It blossoms and perfects its fruit in the open air until the ground freezes. The variety is not remarkably high flavored, of medium size, and an ordinary bearer, but perfectly hardy. In pots they will blossom, and ripen fruit through the winter."

It may be the Red Alpine, but we can not determine this point from his description.

† *Hautbois*, high wood—that is, wood strawberries with high leaves and fruit stalks.

growing sorts, two feet apart. For some of the smaller sorts one foot or eighteen inches will do. "Care should be taken that the plants are put into the ground just as they came out of it—that is, with all their laterals spreading, and not all gathered together and crammed into a little hole." If your principal sort is a pistillate, you must plant a sufficient number of staminate plants to impregnate the others. Of the Early Scarlet, one row to eight of the pistillates will be enough. Of less vigorous kinds, more are required. It is well to plant them in alternate strips, thus:

P
P
P
P P

PATH.

S S

PATH.

P
P
P
P P

The staminate strip may, of course, consist of several rows if desirable.

In planting the hermaphrodite or perfect flowered varieties, as the Woods, Alpines, and Hautbois, of course no such arrangement is required. Planting may be done with success either in autumn or spring. Keep the ground well worked between the rows, to keep it free from weeds, and, unless you want new plants for a future setting, cut off all the runners so soon as they appear. A light mulching with partially decayed leaves or straw, covering the whole ground, but not the plants, will prove highly beneficial, especially in dry seasons and at the South. Before the fruit begins to ripen, cover the ground with a thin layer of straw, hay, or new-mown grass, to keep the fruit clean. Every autumn, if the plants be not sufficiently luxuriant, a light top-dressing of manure should be applied.

A strawberry bed must always be renewed after the fourth year. An easy mode of renewing a strawberry is what is called cultivation in alternate strips. On the third summer from planting, suffer the runners to grow and root into the spaces between the rows; then, in the fall or spring, dig up the old plants, and your new rows are already formed in what were last year the spaces between the rows. At the end of three years repeat the process, and so on, not forgetting to spade in a generous quantity of vegetable manure whenever you dig up the old rows.

“To accelerate the ripening of strawberries,” Downing says, “it is only necessary to plant the rows or beds on the south side of a wall or tight fence. A still simpler mode is to throw up a ridge of earth three feet high, running east and west, and to plant it in rows on the south side.” Ten days or more may be gained in this way; and if later fruit be desired, rows planted on the north side would probably have their fruiting retarded nearly as much.

Mr. Peabody, of Georgia, one of the most successful strawberry culturists in the world, insists with great emphasis that no animal manure should be used in the cultivation of this plant. The grand secret of success, he says, is *to feed the plant for fruit, and not for vine*—to stint the natural luxuriance of the latter, and turn all the vital forces of the plant to the production of berries. In this way, and by keeping the ground shaded by mulch, and continually watering his plants, he has fine strawberries for nine months out of the twelve. “Let the cultivator remember,” he says, “the four great requisites for a profitable strawberry bed: Proper location, vegetable manures, shade to the ground, and WATER, WATER, WATER.” The shade to the ground is secured by the mulching we have recommended. The watering is less essential at the North than at the South, but is often very advantageous. Let no reader of this little work neglect to plant a strawberry bed, and enjoy with thankfulness its delicious fruits.

VI.—MISCELLANEOUS FRUITS.

1. THE FIG—*Ficus Carica*.

This delicious southern fruit is a native of Asia and Africa, and has been cultivated from the earliest times. In our Southern States it grows almost spontaneously everywhere. In the Middle States it may be cultivated in the open air, by keeping it low, and covering it well during the winter. For a selection of choice varieties, the following are recommended:

RED, BROWN, OR PURPLE.

Brunswick (purple),	Malta (brown),
Brown Turkey,	Black Genoa,
Brown Ischia,	Black Ischia,
Small Brown Ischia,	Violette,
Alicante (purple),	Pergussetta (light purple).

WHITE, GREEN, OR YELLOW.

Common White,	Nerii (light green),
White Genoa,	White Ischia.

The fig is propagated by cuttings either of the shoots or the root, and planted either in the fall or the spring. Planted in hot-beds in January, they will form handsome plants the same season. Layers also may be made, and suckers taken off for planting. Set them out fifteen feet apart, and the first winter after planting they may be cut off nearly to the ground. The next year they will make vigorous shoots, one or more of which may be allowed to grow, and the rest rubbed off. When young, it is best even at the South to protect the tree during the winter by covering it with evergreen branches. Little pruning is required. North of Philadelphia the branches must be bent down to the ground on the approach of winter, and covered with three or four inches of soil. No one who lives in a climate adapted to their growth should fail to cultivate a few fig-trees.

2. THE POMEGRANATE—*Punica Granatum*.

This unique and beautiful fruit should receive more attention

than has hitherto been given to it in all Southern gardens. It will grow readily so far north as Maryland, but does not always mature its fruit perfectly north of South Carolina. The tree is quite ornamental, and the fruit has a very refreshing acid pulp. Its singular and beautiful appearance renders it a welcome addition to the dessert. It is also used medicinally in fevers, on account of its cooling nature. It might be exported from the South to any extent. It is propagated by cuttings, layers, or suckers, and is very



BRANCH AND FRUIT.

easily cultivated. The finest varieties are the Sweet Fruited, the Sub-acid Fruited, and the Wild Acid Fruited. Besides these, there are several double-flowering varieties, which are very beautiful.

3. THE MULBERRY—*Morus* of species.

The mulberry deserves mention here, and a place in the garden or lawn. It is a hardy and handsome tree, and produces a palatable and wholesome fruit.

The Red Mulberry (*morus rubra*) is a native species, but is less desirable for the garden than the Black Mulberry (*morus nigra*), a species much esteemed and widely cultivated in Europe. This sort will hardly succeed, except in very warm and sheltered situations, north of New York. It is propagated by cuttings, and easily cultivated.

VIII.

THE FLOWER GARDEN.

God might have bade the earth bring forth
 Enough for great and small,
 The oak-tree and the cedar-tree,
 Without a flower at all.

He might have made enough, enough
 For every want of ours—
 For luxury, medicine, and toil,
 And yet have made no flowers

Our outward life requires them not—
 Then wherefore have they birth?
 To minister delight to man;
 To beautify the earth;

To comfort man—to whisper hope,
 Whene'er his faith is dim;
 For whoso careth for the flowers,
 Will much more care for him.—*Mary Howitt.*

I.—INTRODUCTORY REMARKS.



HE who loves not flowers, and grudges the few square feet of soil which they are grumblingly permitted to occupy in a corner of his garden, may skip over this chapter. We give him our heartfelt pity; and to the wife or daughter, whose more refined and elevated tastes have not allowed him to devote his front yard to the cultivation of potatoes and cabbages, we offer our thanks.

Had we room, we could prove even to the devotee of literal utilitarianism, that the flower garden has its uses—that lilies and dahlias have quite as important a mission in the world as beets and carrots; but we must forego the arguments and illustrations which this course would call for, and

confine ourself to the less interesting, but perhaps more useful, details which follow.

A word, however, to the ladies, to whom we most respectfully dedicate this chapter. We shall take it for granted that you love flowers; for we hold that she who does not, is no true woman. But perhaps you are ready to declare that, positively, you have no time to devote to their cultivation; that you have not sufficient strength for such labor; or, possibly, that all out-of-door employments are ungenteel and unfeminine.

Unless you have time to be sick, which you will hardly admit, you have time to take care of your health. To do this properly, you must have *daily exercise in the open air*. Where can you take this more pleasantly or more profitably than in your flower garden? You are not strong enough, do you say? This is just the way to acquire strength. Begin very moderately, allowing some stronger person to do the heaviest work. An hour or two of light, active, and pleasurable employment, out-of-doors, each fair day, take our word for it, will prove more beneficial than the best tonic mixture that your good and much respected doctor, with all his skill, can prepare for you. Try it. You will soon be able to use the light hoe and spade, which we recommend you to procure at once, with ease and pleasure. The quack's Female Pills find few patrons among the wives and daughters who cultivate their own flower gardens. The idea that the employment is unsuited to woman is a preposterous and absurd one. Where is her place if not among the flowers—herself the fairest flower of all? Shall she blush to own that her own fair hands have reared the floral gems with which she adorns her hair? But we rejoice in believing that few of our readers will urge *this* plea. They will, for the most part, fully agree with us that floriculture should have a prominent place among the female “accomplishments.”

For her light work, a lady requires implements made specially for her use. A spade; a hoe; a rake; a fork; a trowel; a watering-pot; a pruning-knife; a pair of small shears; a

basket, for the weeds and clippings; a small hammer; a ball of twine; a stout apron, with pockets for the pruning-knife, shears, etc.; a pair of strong leather gloves, for handling prickly shrubs; and a pair of overshoes, will make up a very good outfit. The implements should all be light, and of the best quality. The pruning-knife should be kept *very* sharp. Use it for cutting slips, and for removing branches, leaves, etc. The shears are used for clipping hedges, box, borders, etc.

In connection with her gardening operations, we recommend to every lady who has sufficient leisure the study of botany—both structural and systematic.

II.—LAYING OUT A FLOWER GARDEN.

To attempt, within the limits of a few pages, to fully instruct those who have extensive grounds to lay out, would be presumptuous. Such persons will need to study Downing's "Landscape Gardening," or seek the aid of a practical landscape gardener. Our brief hints and suggestions are intended for those whose ornamental grounds are measured by rods instead of acres.

We will suppose that, as is generally the case, you wish to devote a portion of the space immediately around your dwelling-house to the cultivation of flowers.

If the distance between the entrance gate and the house be small, you must be content with a straight walk from the one to the other; but this should be relieved, and its necessary stiffness somewhat modified, by curved side-walks, branching from the main walk near the front door, and running back to the vegetable garden in the rear of the house. Where the space is a little greater, the straight walk should not be tolerated. It may be curved in various ways, as taste may suggest, and the nature of the case permit. The walks may all have edgings of dwarf box. Near these walks we recommend cutting a sufficient number of flower-beds in the turf. This gives a much more beautiful appearance to the yard than it would have if devoted exclusively to flower-beds. If more

space be wanted, it may, perhaps, be found behind the house, and next the fruit or vegetable garden. The beds thus cut in the turf may be of various shapes and sizes, but should always be bounded by curved lines. The grass-plots in which they are situated should be kept smoothly shaven.

In arranging the plants in your beds, place the tallest in the center; but very tall growers, like the hollyhocks and sun-flowers, should, in general, be disposed as a back-ground in borders next the walls. So arrange all the kinds that the smaller shall not be hidden or too much shaded by the larger, but all be seen in their order, and each contribute to the general effect. Reference must also be had to colors and their proper combination. It is well, so far as is possible, to select plants which appear well through the season, whether in blossom or not. A constant succession of flowers in each bed may be secured by commencing with the early flowering bulbs, following these with the best herbaceous perennials, and closing with a good selection of annuals.

Climbing plants of various kinds, both annual and perennial, if judiciously introduced, add greatly to the beauty of the grounds around a dwelling. Walls may be mantled with them; doors and windows enwreathed; any unsightly object hidden; arbors covered; and posts and the trunks of trees entwined. They may also be permitted to trail among the smaller shrubs—care being taken, of course, that they do not, in their luxuriance, overpower or hide other plants. Various kinds of supports for climbers may be introduced into the portions of the yard devoted to trees and shrubs. The simplest of these is a single upright pillar of cedar or other durable wood in its rough bark, or a sawed piece of timber with holes bored through it at regular intervals, through which the leading shoots may be drawn as they advance in growth. Prairie roses, bignomas, and other hardy climbers, if skillfully trained, make a very handsome appearance on such pillars. Two climbing roses, of unlike colors, may be thus trained together with a fine effect. These posts should be nine or ten feet high.

In some cases it is better to drive strong wooden rods through the holes we have spoken of, for the support of the climber. Slender climbers, like the cypress vine and the morning glory, require a lighter and more elegant support.

In the arrangement of the shrubs and trees the same principle applies as to the herbaceous plants. We should endeavor to produce the effect of banks, and irregular and picturesque conical masses of foliage, rising higher as they recede from the eye. We therefore place the larger growing kinds in the back row, or in the center of a group, as the case may be; somewhat smaller ones next in order, and still smaller ones in front.

III.—GENERAL DIRECTIONS.

Our very limited space will not permit us to go into details in reference to the cultivation of flowers. With a few general directions, however, one may get on very well in the management of a small flower garden. What is most needed is some guide in the selection of plants to be cultivated; and this we shall furnish in the next section.

1. *Soil, etc.*—For most kinds of flowers a rather sandy soil, well enriched with vegetable mold and well-rotted stable manure, is the best. It must be thoroughly broken up or pulverized before planting. This is even more necessary here than in the kitchen garden. The ground should be dug to the depth of fifteen inches, and raised a few inches above the general level of the garden or yard.

2. *Annual and Biennial Plants.*—Annual* and biennial† plants are in general very easy of cultivation, merely requiring, in a majority of cases, to be sown where they are to bloom, thinned out (with a few exceptions, which will be noted in their place) to give them room, and kept free from weeds.

Never sow till the soil has become tolerably warm and dry, as some flower-seeds are very liable to rot in the ground. In

* Annual plants are those which live but one year.

† Biennial plants are such as endure two years; blooming on the second.

this climate, from the middle of April to the first of May, in ordinary seasons, will be sufficiently early for most of them. A little farther north, from the first to the middle of May will be the average time. The smaller seeds must be very lightly covered, but larger ones, like the lupines, may be covered to the depth of two inches. It is a good way to sow in small circles—say from four to nine inches in diameter. In the center of this circle place a tally, or label of some kind, with the name, to prevent mistakes. Soon after they come up, the soil must be carefully stirred, the plants thinned out, if they require it, and all weeds removed. A few kinds do better with transplanting than to remain where they are sown. Of this nature are the balsams, the China aster, the marigold, the hibiscus, and the zinnia, and several other very free-growing plants.

3. *Bulbs*.—The best season for planting hardy bulbous roots, such as the lilies, peonies, etc., is late in autumn, but they may be set out in December if the ground be not frozen, and the bulbs remain sound.

“Hyacinths, Amaryllis, Martagon, and other large lilies, and peonies, should be planted at the depth of four inches; Crown Imperials and Polyanthus Narcissus, five inches; Tulips, Double Narcissus, Jonquilles, and Colchicums, three inches; Bulbous Iris, Crocus, Arums, small Fritillarias, Gladiolus Byzantium, and Snowdrops, two inches; Ranunculus and Anemones, one inch; always measuring from the top of the bulb. The roots should be placed from four to six inches apart, according to their size.

“Take up bulbous roots about a month after the blossom is completely over, in the following manner: When the plants put on a yellowish, decayed appearance, take up the roots, cut off the stem and foliage within an inch of the bulbs, but leave the fibers, etc., attached to them; spread them in an airy room for two or three weeks to dry, after which wrap each root carefully in paper (as the air is very injurious to bulbs), or cover them in sand perfectly dry.”

4. *Shrubs*.—Flowering-shrubs may be planted out so soon as the frost is out and the ground sufficiently dry, which will generally be in April. The same general directions apply as have already been given for trees. Tall shrubs should be supported for a while by a stake. The roots must not be permitted to dry before planting; and if they are to be carried to a distance, they must be kept from the air by means of moss, or straw mats bound about them.

IV.—LISTS OF FLOWERING PLANTS AND SHRUBS.

We now proceed to give lists of choice herbaceous plants and flowering shrubs. We might make our catalogues much more extensive, and still fail to embrace all that are desirable in particular localities and under particular circumstances. We trust that they will be found useful, if not wholly satisfactory, to the novice. For the professional gardener, of course, we do not write.

HARDY ANNUALS.

1. BLUE FLOWERED ARGERATUM (*Argeratum Mexicanum*).—Color, blue; height, one foot; in bloom all the season.
2. SWEET ALYSSUM (*A. calycina*).—White; fragrant; six inches; all season.
3. LOVE LIES BLEEDING (*Amaranthus candatus*).—Red and yellow; sum.
4. PRINCE'S FEATHER (*A. hypochondriacus*).—Red; summer.
5. THREE-COLORED AMARANTH (*A. tricolor*).—Is most beautiful on rather poor soil; summer
6. PHEASANT'S EYE (*Adonis miniata*).—Red; showy; summer.
7. CHINA ASTER (*A. Chinensis*).—Various colors; some lately imported varieties are very beautiful; eighteen inches; summer.
8. COCKSCOMB (*Celosia cristata*).—Crimson; eighteen inches; autumn.
9. SWEET SULTAN (*Centaurea* of species).—(*C. moschata*), purple; (*C. cretica*), white; (*C. suaveolens*), yellow; two feet; summer.
10. MORNING GLORY (*Convolvulus major*).—Various; climbing; summer and autumn.
11. DWARF MORNING GLORY (*C. minor*).—Blue; eighteen inches; summer.
12. CHRYSIS (*C. crocea*).—Orange; one foot; all the season; (*C. Californica*) yellow.
13. LUPINE (*Lupinus* of species).—Many varieties; various; one to five feet; some are perennial.
14. CYPRESS VINE (*Ipomœa* of species).—(*I. quamoclit*), crimson; (*I. alba*), white; climbing; summer and autumn. *I. coccinea*, a native Southern plant; is generally classed with the morning glories; red; climbing; autumn.

15. PHLOX (*P. Drummondii*).—Crimson; rose, lilac, and white; (*P. Van Houtii*), variegated; two feet; all the season.

16. ZINNIA (*Z. elegans*).—Various; two feet; very showy; should be watered copiously; all the season.

17. BALSAM, OR LADIES' SLIPPER (*Balsamina hortensis*).—Various; two feet; summer and autumn.

18. MIGNONETTE (*Reseda odorata*).—Yellowish green; six inches; chiefly valued for its perfume; all the season.

19. NASTURTIUM (*Tropaeolum atrosquinneum*).—Crimson; climbing; in bloom all the season.

20. CANARY BIRD FLOWER (*T. aduncum*).—A beautiful climber.

21. PORTULACCA (*P. splendens*).—Purple; splendid; (*P. Thorburnii*), yellow; (*P. alba*), white; (*P. elegans*), crimson; (*P. Thellusonii*), red; should be grown in a mass to give the finest effect.

22. MALOPE (*M. grandiflora*).—Scarlet and white; three feet; summer.

23. TEN-WEEK-STOCK (*Mathiola annua*).—At least a dozen distinct colors; one foot; summer. All the varieties are well worthy of cultivation.

24. MARIGOLD (*Tugetes erecta*).—Orange, yellow, straw-colored; eighteen inches; autumn. French Marigold (*T. patula*), striped with deep brown, purple, and yellow.

25. CLARKIA (*C. elegans*).—Rose-colored; elegant; (*C. Pulchella*), purple; showy; (*C. alba*), white; one foot; all the season.

26. CANDYTUFT (*Iberis amara*).—White; (*I. umbellata*), purple; (*I. violacea*), violet; (*I. odorata*), sweet-scented. All these species are desirable.

27. LARKSPUR (*Delphinium ajacis*).—Many varieties, double flowered, and superb. Branching Larkspur (*D. consolida*), various colors; summer.

28. THREE-COLORED GILIA (*G. tricolor*).—Light-blue margin and dark center; dwarf; summer.

29. PAPPY (*Papaver Marseillii*).—White, edged with red; eighteen inches; summer.

30. SWBET PEA (*Lathyrus odoratus*).—Many varieties—white, black, scarlet, and variegated; three or four feet; summer and autumn.

31. HIBISCUS (*H. manihot*).—Yellow; (*H. Africanus major*), buff, with a black center; two feet; summer.

32. CLINTONIA (*C. elegans*).—Blue; six inches; very slender; autumn.

33. VERBENA (V. of species).—Every shade of color from white to crimson; procumbent; very pretty; all the season.

34. DWARF SUNFLOWER (*Helianthus Californicus*).—A double flower.

35. SUN LOVE (*Heliophila araboides*).—Blue; very pretty.

36. PANSY (*Viola tricolor*).—Various; all the season. [A perennial, but treated as an annual.]

37. PETUNIA (*P. violacea*).—Every variety of color; dwarf; all the season.

38. YELLOW EVERLASTING (*Xeranthemum* of species).—Eighteen inches; aut.

39. EVENING PRIMROSE (*Oenothera macrocarpa*).—Yellow; large flowered; dwarf; summer and autumn.

40. LOASA (*L. lateritia*).—Orange colored; a beautiful climbing plant.

41. CALANDRINIA (*C. discolor*).—Rosy purple; very fine; sum. and autumn.

42. CALLIOPSIS (*C. bicolor*).—Three feet; very showy; autumn.
 43. MARVEL OF PERU (*Mirabilis Jalapa*).—Many varieties; autumn.
 44. GROVE LOVE (*Nemophila maculata*).—Spotted; beautiful.
 45. HELIOTROPE (*Tournefortia heliotropoides*).—White and blue; very fragrant; autumn.
 46. LOVE-IN-A-MIST (*Nigella Damascene*).—Showy; autumn.

For twelve sorts, the following would be a good selection: Numbers 1, 2, 7, 9, 10, 14, 15, 21, 23, 25, 33, and 37. To make up twenty sorts add 6, 11, 13, 16, 19, 22, 29, and 41.

HARDY BIENNIALS.

1. ROSE CAMPION (*Ayrostemma coronaria*).—Blooms all summer.
2. FOXGLOVE (*Digitalis* of species).—Purple, white, and spotted.
3. CANTERBURY BELL (*Campanula* of species).—Various; blooms in July and August.
4. HOLLYHOCK (*Althea rosa*).—All its varieties; summer and autumn. Desirable varieties can be propagated by dividing the roots. Biennial-perennial.
5. GERARDIA (*G.* of species).—Yellow, purple, and spotted.
6. DWARF EVENING PRIMROSE (*Oenothera corymbosa*).
7. HUEA (*H. elegans*).—All the season.
8. CATCH FLY (*Silene multiflora*).
9. MUSK-SCENTED SCABIOUS (*Scabiosa atropurpurea*).
10. NAKED-STEMMED POPPY (*Papaver nudicaule*).

Though all the biennials are generally propagated by seeds, the double ones may also be successfully continued by cuttings and slips of the tops, and by layers and pipings. Biennials, it should be remembered, never flower till the second year.

HARDY PERENNIALS.*

1. HERBACEOUS PLANTS.†

1. COLUMBINE (*Aquilegia vulgaris*).—Single and double, and many colors.
2. HAREBELL (*Campanula* of species).—All the species of this genus are very beautiful. Flowers single and double; many colors. *C. grandiflora* has superb blue flowers.
3. CARNATION (*Dianthus caryophyllus*).—A much noted and very beautiful flower; propagated by seeds and by layers.
4. SWEET WILLIAM (*D. barbatus*).—Many colors and shades of color—white, red, pink, and crimson. The French call it *boquet parfüit*.

* Perennial plants are those which endure from year to year indefinitely.

† Those which die down to the root every year. In a restricted sense (in which we use it here), the term herbaceous is not made to include the bulbous and tuberous rooted plants.

5. PINK (*D. plumarius*).—Many varieties.

6. CHRYSANTHEMUM (*Pyrethrum* of species).—Varieties and colors numberless; the last showy flower of the season. The following are all very beautiful:

LARGE FLOWERED.

Defiance—lemon-yellow.
Baron de Solomon—rosy-crimson.
Julia Langdale—rosy-purple.
Liencour—lilac and orange.
Magnificent—blush.
Mrs. Cope—crimson-purple.
Sphinx—bright claret.
White Perfection—pure white.

SMALL FLOWERED.

La Fiancée—white.
Harriette Lebois—rosy-carmine.
Cybelle—amber and gold.
Mignonette—rose.
Vartigene—crimson.
Paquerette—white-shaded crimson.
Sacramento—dark yellow, red center.
Louise—pale rose.

7. DOUBLE DAISY (*Bellis perennis*).—Many varieties and various shades of white, pink, and crimson.

8. DIELYTRA (*D. spectabilis*).—A very beautiful plant; flowers pink and white; June and July.

9. FOXGLOVE (*Digitalis* of species).—Various and beautiful. Theoretically a biennial; but may be continued by dividing into off-sets.

10. GENTIAN (*Gentiana* of species).—Blue, yellow, and white; very showy.

11. GERANIUM (*Pelargonium* of species).—Species numerous; varieties numberless. For bedding plants the Scarlet, the Nutmeg-scented (white), and the Rose are the most desirable.

12. FORGET-ME-NOT (*Myosotis sylvatica*).—Blue, pretty, and indispensable.

13. HOLLYHOCK (*Althea rosa*).—We have mentioned this among the biennials, where it theoretically belongs; but it is practically a perennial, from the way in which it increases by off-sets. Hollyhocks are very beautiful in their proper places—in borders and among shrubbery. The varieties and colors are numberless. Choose the double-flowering sorts.

14. LUPINE (*Lupinus* of species).—Some of the perennial herbaceous sorts are very beautiful; early in summer.

15. DOUBLE RAGGED ROBBIN (*Lychnis* of species).—Scarlet and white.

16. PANSEY, OR HEARTSEASE (*Viola tricolor*).—Varieties innumerable; sometimes treated as an annual; blooms all the season.

17. VIOLET (*Viola* of species).—Many of the species, both native and foreign, deserve a place in the garden. Of *V. odorata plena*, the white and purple varieties are very beautiful; bloom early.

18. PHLOX (*P.* of species).—Various colors; no garden should be without some of the perennial species; summer.

19. VERONICA (*V. chamædrys*).—Blue flowers; a good border plant; early in summer.

20. VALERIAN (*V. hortensis* et *V. Pyrenaica*).—White and red; grow and bloom well on walls and rock-work.

Nearly all the foregoing plants are easily propagated by dividing the roots, and will grow in any garden soil. A few of them will not prove hardy north of New York.

2. TUBEROUS-ROOTED PLANTS.

1. DAHLIA (*D. variabilis*).—Colors and varieties numberless; a splendid autumn flower for large beds and among shrubbery. The following are a few of the finest varieties:

Amazone—yellow, margined with carmine.

Anna Maria—violet, tipped with white.

Belle Amazone—bright yellow, edged with gold.

Favorite—dark carmine.

Gazelle—delicate blush.

Grand Sultan—dark purple, with light edges.

Emperitric Eugenie—black brown.

Madame Becker—maroon, tipped with white.

Malvina—purple, shaded with darker purple.

Renuncule Imperiale—lilac and purple.

Prétrose—dark carmine.

Wonderful—dark yellow, with purple stripes.

2. IRIS (*I.* of species).—More than fifty species, some of which are tuberous-rooted; all very beautiful. *I. susiana* is the finest; flowers large and spotted with brown.

3. MARVEL OF PERU (*Mirabilis Jalapa*).—Generally treated as an annual; very beautiful; requires a warm border.

4. EVERLASTING PEA (*Lathyrus* of species).—The common Everlasting Pea is *L. latifolius*. Once planted it will, for the most part, take care of itself. Some of the species are annuals.

5. PEONY (*P. officinalis*).—Many varieties. The Chinese Peony (*P. fragrans*) has pinky-purple flowers and a rose-like perfume.

6. RANUNCULUS (*R.* of species).—Several species are hardy and desirable for border-plants. The Double Buttercup (*R. acris*) is well known.

7. LADIES' SLIPPER (*Cypripedium* of species).—Several species are natives of our woods; very beautiful, but difficult of propagation.

8. ANEMONE (*A.* of species).—Many species; white, purple, yellow, and scarlet; succeed best in cool latitudes. Our native Wood Anemone (*A. nemorosa*) deserves mention among the garden flowers.

The tuberous-rooted plants are propagated by tubers, and some of them also by seeds. Dahlias require a sandy soil. Sand and vegetable mold make a good mixture for them. No animal manure should be applied.

3. BULBOUS-ROOTED PLANTS.

1. CROCUS (*C.* of species).—Many species; yellow, lilac, white, etc. The Yellow Crocus (*C. luteus*) is the greatest favorite. The Spring Flowering (*C. vernus*) works in well among shrubs and trees; blooms early in the spring.

2. CROWN IMPERIAL (*Fritillaria Imperialis*).—Color varies from light yellow to orange red; showy; suitable for borders.

3. **HYACINTH** (*Hyacinthus Orientalis*).—Varieties innumerable; choose an assortment of various colors.

4. **IRIS** (*I.* of species).—Of the bulbous species, the Persian (*I. Persica*) is the most beautiful, but does better in a pot or frame, with some protection.

5. **LILY** (*Lilium* of species).—The species are very numerous, and all very beautiful. The following is a selection:

Common White (*L. candidum*).

Double White (*L. candidum flore pleno*).

Scarlet (*L. chalcedonicum*).

Japan (*L. lancifolium* of var.)—white, red, rose, spotted; very beautiful.

Turk's Cap (*L. martagon*)—various.

Tiger (*L. tigrinum*).

6. **NARCISSUS** (*N. tazetta*).—Yellow and white variously combined; varieties numerous.

. **DAFFODIL** (*N. pseudo narcissus*).—Many varieties.

8. **JONQUIL** (*N. jonquilla*).—Bright yel.; fragrant; requires copious watering.

9. **SNOWDROP** (*Galanthus nivalis*).—Double and single; both desirable.

10. **SQUILL** (*Scilla* of species).—Blue and white; *S. amœna* and *S. Siberica* are exceedingly brilliant and beautiful; blossom early in spring.

11. **STAR OF BETHLEHEM** (*Ornithogalum* of species).—White and variegated; easy of cultivation.

12. **TULIP** (*Tulipa Gesneriana*).—Varieties innumerable and of every shade. There are early and late sorts. Choose some of both.

FLOWERING SHRUBS.

1. **ROSE** (*Rosa* of species).—Multitudinous in species and countless in variety. No two persons would make the same selection. For the few sorts wanted in a common garden, we suggest the following:

HYBRID PERPETUAL ROSES.

Augusta Mie—blush.

Geant des Batailles—brilliant crimson.

Caroline de Sansal—flesh color.

Lord Raglan—fiery crimson.

Matharin Regina—lilac.

General Jaqueminot—crimson-scarlet.

Mrs. Elliott—rosy-purple.

Duchess d'Orleans—rosy-carmine.

Baron Hallez—light crimson.

Sydonie—light pink.

Baron Prevost—deep rose.

La Reine—deep rosy lilac.

Louis Peronny—deep rose, shaded.

PERPETUAL MOSS ROSES.

Madam Edward Ory—rosy carmine.

Marie de Burgoyne—clear red.

Salet—bright rosy red.

General Drouot—purplish crimson.

Perpetual White—pure white.

SUMMER ROSES.

Coupe de Hebe—brilliant pink.

Paul Ricaut—rosy crimson.

Perle de Panche—white and red.

Persian Yellow—deep golden yellow.

Madame Plantier—pure white.

CLIMBING ROSES.

Queen of the Prairies—red, striped with white.

Baltimore Belle—blush, nearly white.

Mrs. Hovey—pale blush.

Perpetual Pink—purple pink.

2. RHODODENDRON (*R. Catawbiense*).—This splendid American flowering shrub is worthy of a place in every garden.

3. AZELIA (*A. viciosa* et *A. nudiflora*).—White and purple; fragrant; too much neglected.

4. FLOWERING ALMOND (*Amygdalus nana*).—Beautiful pink flowers. Very desirable in every garden. Spring.

5. MAGNOLIA (*M. abovata*).

6. TREE PEONY (*P. Moutan*).

7. JAPAN QUINCE (*Pyrus Japonica* of var.).—Scarlet and white; very early in the spring.

8. JAPAN GLOBE FLOWER (*Kerrier Japonica*).—Double yellow flowers. Showy. Spring.

9. SPIRÆA (*S.* of species).—Many very beautiful species. The Lance-Leaved Spiræa (*S. lanceolata*) is the most beautiful of all. Flowers, white; blooms in May. Very desirable indeed.

10. DEUTZIA (*D. gracilis* et *D. scabra*).—Flowers white. *D. scabra* is the more hardy. Both should be cultivated where the climate will permit.

11. GUELDER ROSE OR SNOWBALL TREE (*Vibromum opulus*).

12. GARDEN HYDRANGEA (*H. Hortensia*).—White flowers.

13. LILAC (*Syringia* of species).—Some of the new varieties are very fine.

14. POMEGRANATE (*Granatum flore pleno*).—Beautiful; should be a favorite wherever the climate is sufficiently mild.

15. SWEET SCENTED SHRUB (*Calycanthus Floridus*).

16. ALTHEA OR ROSE OF SHARON (*Hibiscus Syriacus*).—Many varieties.

17. HONEYSUCKLE (*Lonicera* of species).—Beautiful shrubs.

18. PINK MEZEREUM (*Daphne mezereum*).—Dwarf, pretty; flowers in March.

19. ROSE ACACIA (*Robina hispida*).

20. MOCK ORANGE (*Philadelphus coronarius*).—White; fragrant. May and June.

21. FORSYTHIA (*F. vividissima*).—A magnificent new shrub from China; flowers bright yellow; very early in spring.

22. CRIMSON CURRANT (*Ribes sanguineum*).—Single and double crimson; early in spring.

23. ASHBERRY (*Mahonia aquifolia*).—Evergreen; bright yellow flowers; blossoms very early in spring.

24. ROSE-COLORED WIEGELA (*W. rosea*).—Delicate rose-colored blossoms.

25. SILVER BELL (*Halesia* of species).—*H. diptera* is much finer than the common Silver Bell (*H. tetraptera*).

CLIMBERS AND CREEPERS.

1. VIRGINIA CREEPER (*Ampelopsis hederacea*).

2. TRUMPET FLOWER (*Tecoma radicans**).

3. CLEMATIS (*C.* of species).—Several species; white, blue, and purple. The Sweet Scented (*C. flammula*) is exceedingly fragrant.

* Gray; the *Bignonia* of the old botanists.

4. IVY (*Hedera* of species).

5. HONEYSUCKLE (*Lonicera* of species).—The Sweet Scented (*L. Belgica*) is one of the most desirable species; in bloom through the summer; very fragrant. The Chinese Evergreen (*H. sinensis*) is also a very fine sort.

6. CHINESE WISTARIA (*W. sinensis*).—A very beautiful climbing plant; pale blue flowers in clusters.

7. CLIMBING ROSE (*Rosa* of species).—For these, see preceding list.

8. JASMINE (*Jasminum revolutum*).—Bright golden flowers; very fragrant. Southern. Deserves a place in every garden at the South.

9. PASSION FLOWER (*Passiflora* of species).—The most beautiful one is the Purple Flowering (*P. incarnata*).

10. BIRTHWORT OR DUTCHMAN'S PIPE (*Aristolochia sipho*).—An excellent arbor vine.

IX.

ORNAMENTAL TREES AND SHRUBS.

Happy is he who in a country life
Shuns more perplexing toil and jarring strife;
Who lives upon the natal soil he loves,
And sits beneath his old ancestral groves.

I.—GENERAL HINTS.



HAPPY indeed is he

Who lives upon the natal soil he loves,
And sits beneath his old ancestral groves;

but this happiness is the lot of comparatively few in this country. Our forefathers were too deeply absorbed in the work of hewing down forests to think of planting groves, or to appreciate their beauty. They waged a war of extermination against trees, and, so far as they went, nothing but blackened stumps and unsightly skeletons remained. The effects of their indiscriminate "clearing" have been partially remedied in the older portions of the country (for which more thanks to nature than to man); but even there the language of our motto applies to only a few. Each man's natal soil is in the hands of a stranger. What American lives where his father and grandfather lived and died? We have been a migratory people. It will not always be so, however, and if we can not, except in rare cases, "sit beneath our old ancestral groves," we may yet sit beneath those of our own planting—may learn to

Love our own cotemporary trees,

and die with the hope that our children and grandchildren may enjoy their shade after we have ceased to need it.

The exhortation, "Plant trees! plant trees!" which has gone forth of late, and been so often reiterated, has not fallen upon heedless ears. Thousands have obeyed it, and tens of thousands stand ready, and only wait to be told what trees to plant, and how to plant them.

For planting trees, we have already given such general directions as the limits of our work would permit. With a careful attention to the fundamental principles set forth in the first and second chapters, these directions will be found sufficient. It remains for us to add a few hints on arrangement, etc., and to give lists of the most desirable species for common use, as ornamental and shade trees and shrubs.

As a border for a straight road or street, we must, of necessity, have a straight row of trees, if any; but in laying out the road or street, simple utility, and not beauty, was the end in view. In laying out ornamental grounds, straight lines and a geometrical arrangement of objects must be avoided; and any necessary straight line, like a boundary fence, should be wholly or partially hidden, and its effect neutralized, by curving rows and irregular groups of trees and shrubs.

This principle applies to the smallest village plot as well as to the extensive park. Something may be done in arrangement and grouping to produce a pleasing and beautiful or picturesque effect, in a very limited space. To tell the reader how, in detail, would require a volume. The hint we have just dropped will at least lead him to think and inquire. His own taste, once awakened, will do the rest.

Do not, we beg of you, distort and deform your ornamental trees by trimming. If any accident or unnatural condition may have caused a tree to grow into an ungraceful and unnatural shape, you may, by a judicious use of the pruning-knife, aid it to return to its natural form; but you can not improve a free-growing and symmetrical tree. If it put out branches near the ground, do not, by any means, remove them. Therein consists much of the beauty of many of our handsomest trees, especially the evergreens.

Other things being equal, preference should be given to native trees and shrubs, and we have so many beautiful species that but few foreign ones need be placed on our lists.

Trees taken from the nursery or forest before they can be used must be "heeled in"—that is, their roots must be placed in a trench prepared for the purpose, and covered with earth. Roots left exposed to the sun and winds soon lose their vitality. Avoid the common error of too deep planting. The tree should be set only two or three inches deeper than it stood before, in the nursery or forest, to allow for the settling of the soil.

II.—LISTS OF TREES AND SHRUBS.

Those who desire more extensive lists to select from than our space allows us to give, can readily obtain them from the nurserymen. Our object is to aid the novice in making a selection of a few kinds.

LARGE-GROWING TREES.

DECIDUOUS.*

1. OAK (*Quercus* of species).—Well known; indispensable in extensive grounds—especially the White Oak (*Q. alba*).

2. AMERICAN ELM (*Ulmus Americana*).

3. MAPLE (*Acer* of species).—In an article condemnatory of the ailanthus, the lamented A. J. Downing says: "Take refuge, friends, in the American maples; clean, sweet, cool, and umbrageous are the maples." For the Middle and Western States the Silver Maple (*A. dasycarpum*) is the best. For the North and East the Sugar or Rock Maple (*A. saccharinum*) is better. The Red Flowering (*A. rubrum*) and the Norway (*A. platanoides*) are beautiful trees, but of slower growth.

4. BLACK WALNUT (*Juglans nigra*).—Adapted to extensive grounds.

5. ASH (*Fraxinus Americana*).—Fine to group with other trees.

6. HORSE CHESTNUT (*Æsculus* of species). The White Flowering (*Æ. hippocastanum*) and the Red Flowering (*Æ. rubicundo*) are desirable.

7. TULIP TREE (*Liriodendron tulipifera*).—Lofty and magnificent.

8. CUCUMBER TREE (*Magnolia acuminata*).—A large, beautiful tree, with bluish-white flowers. All the magnolias are desirable where they will succeed. The most magnificent of them all (*M. grandiflora*) will flourish only at the South, where it is deservedly a favorite.

9. LARCH (*Larix* of species).—The European (*L. Europea*) is the best. The

* Deciduous trees are those whose leaves fall in autumn—not evergreens.

American or Black Larch Tamarac (*L. Americana*) resembles it, but grows only in very moist soils.

10. AMERICAN CYPRESS (*Taxodium distictum*).—Lofty and magnificent, but requires a moist, rich soil. For the Middle and Southern States.

11. CATALPA (*C. s. ringafolia*).—Makes a large, round head, and large leaves and showy flowers.

12. AMERICAN WHITE BIRCH (*Betula alba*).—A tall, slender, and beautiful tree; has a fine effect for grouping.

13. HONEY LOCUST (*Gluditschia triacanthos*).—Highly ornamental; fine for lawns and for grouping.

14. PAULONIA (*P. imperialis*).—Rapid growing; large-leaved; large blue flowers in clusters; blooms in June. Suitable for Middle and Southern States.

15. WEEPING WILLOW (*Silex Babalonicum*).

EVERGREENS.

1. SPRUCE (*Abies* of species).—The Hemlock Spruce (*A. Canadensis*) is one of the most beautiful of all evergreen trees. Fine for a lawn. The Norway Spruce (*A. excelsa*) is also a stately and magnificent tree.

2. WHITE PINE (*Pinus strobus*).

3. BALSAM FIE (*Picea balsamea*).

4. DEODAR CEDAR (*C. Deodura*).—Graceful and beautiful; rapid growing; not perfectly hardy at the North.

5. CEDAR OF LEBANON (*C. Libani*).—Scarcely hardy at the North, but exceedingly desirable where it will succeed.

6. AMERICAN ARBOR VITÆ (*Thuja occidentalis*).

SMALL TREES AND LARGE SHRUBS.

DECIDUOUS.

1. WEEPING ASH (*Fraxinus excelsior pendula*).—Very graceful.

2. JUDAS TREE (*Cercis Canadensis*).

3. LABURNUM (*Cytissus laburnum* et *C. Alpinus*).

4. MOUNTAIN ASH (*Pyrus* of species).—European and American. The Weeping Mountain Ash (*P. aucuparia pendula*) is a beautiful drooping variety of the European.

5. FRINGE TREE (*Chionanthus Virginica*).—Covered in spring with a profusion of white flowers.

6. HAWTHORN (*Crataegus oxyacantha* of var.).—White, scarlet, and rose-colored flowers; single and double.

7. MAGNOLIA (*M. conspicua* et *M. Soulangeana*).—The first has white and the second purple flowers.

8. BURNING BUSH (*Euonymus atropurpureus*).

9. LARGE FLOWERING SYRINGIA (*Philadelphus grandiflorus*).

10. CORNELIAN CHERRY (*Cornus mascula*).

EVERGREENS.

1. TREE BOX (*Buxus aborescens*).

2. COMMON JUNIPER (*Juniperus communis*).

3. IRISH YEW (*Taxus Hibernicus*).
4. MOUNTAIN LAUREL (*Kalmia latifolia*).
5. AMERICAN HOLLY (*Ilex opaca*).

HEDGE PLANTS.

DECIDUOUS.

1. OSAGE ORANGE (*Maclura aurantiaca*).
2. BUCKTHORN (*Rhamnus Catharticus*).
3. HAWTHORN (*Crataegus oxyacantha*).
4. ALTHEA OR ROSE OF SHARON (*Hibiscus Syriacus*).
5. BERBERRY (*Berberis vulgaris*).

EVERGREENS.

1. AMERICAN ARBOR VITÆ (*Thuja occidentalis*).
2. AMERICAN HOLLY (*Ilex opaca*).
3. HEMLOCK SPRUCE (*Abies Canadensis*).
4. NORWAY SPRUCE (*Abies excelsa*).
5. WHITE CEDAR (*Cupressus thuyoides*).
6. HOLLY-LEAVED BERBERRY (*Mahonia aquifolia*).
7. DWARF BOX (*Baxus suffructicosa*).—For edging.
8. EVERGREEN THORN (*Crataegus pyracantha*).—For the South.
9. CHEROKEE ROSE (*Rosa lævigata*).—Southern.
10. WHITE MACARTNEY ROSE.—The best of all hedge plants for the South.

Live hedges must gradually take the place of our unsightly fences in the older parts of the country, where timber is already scarce. On the prairies of the West there seems to be no other resource. See "The Farm" for directions for their cultivation. Some of the foregoing hedge plants have not been well proved, but are all more or less perfectly adapted to the purpose. The Osage Orange seems as yet to be most generally approved.

APPENDIX.

A.

THE BEARING YEAR.

THIS arises simply from the tendency in the apple, when left to itself, to bear so large crops one year as to require the next year to recover sufficient strength to bear again. This becomes a kind of fixed constitutional habit in a given variety, and is continued by grafting, so that whole orchards bear one year, and are unfruitful the next, with great regularity. On the other hand, certain sorts, like the Belle-fleur and Holland Pippin, which bear but moderate crops, in strong soils bear every year.

The habit itself may be corrected or changed, when the tree or orchard is young, by picking off all the fruit that sets the first year the tree bears a good crop, thus forcing it to take its bearing year the next season.—*A. J. Downing.*

B.

CAUSE OF DIMINISHED FERTILITY.

The first colonists of Virginia found a country the soil of which was rich in alkalies. Harvests of wheat and tobacco were obtained for a century from one and the same field, without the aid of manure; but now whole districts are converted into unfruitful pasture land, which without manure produces neither wheat nor tobacco. From every acre of this land there were removed in the space of one hundred years 1,200 lbs. of alkalies, in leaves, grain, and straw. It became unfruitful then because it was deprived of every particle of alkali which had been reduced to a soluble state, and because that which was rendered soluble again in the course of a year was not sufficient to supply the demands of the plants. . . . It is the greatest possible mistake to suppose that the temporary diminution of fertility in a soil is owing to the loss of vegetable mold. It is the mere consequence of the exhaustion of the alkalies.—*Liebig.*

C.

REMOVING LARGE TREES—"BALLING."

Late in the autumn, dig a circular ditch at a distance of from two to five feet, according to its size, from the trunk of the tree, and from eighteen to thirty inches deep, smoothly cutting off all the lateral roots close to the central mass of earth. This ditch must be kept free from snow, until the inclosed ball containing the roots of the tree is thoroughly frozen. With iron bars and levers force up this circular mass of earth, and place two or more strong skids under it. By means of a strong set of pulleys, with oxen attached, if necessary, the

mass of earth, and the tree altogether, must be drawn over the skids up out of the hole, upon a stone-boat or sled, the tree standing vertically, just as it grew. Thus loaded and secured, it may easily be drawn to the spot selected for it.—*George Jaques.*

D.

NEW VARIETIES OF THE POTATO FROM THE SEED.

The plants from the seeds are about as hardy as tomatoes [and may be sown in the same way either in a hot-bed or in the open air. The former is the preferable way.] They should be hoed often, and dug early, or before the fall rains and cold nights. Some years they will grow large enough for the table, but are not fit to eat until three or four years old.

Each hill should be dug by itself, and all small and unhealthy tubers thrown away, and the good ones labeled and put away carefully for another year's planting. Any plants that have been well cultivated, and only produce small tubers the first year, will never afterward ripen in season.

The second planting will need care and close attention through its growth. Observe the time of flowering, and time of the decay of the vines, that when digging them you may have the history of every hill, for almost every hill is a family by itself.

At this time many sorts can again be rejected, reserving only those that promise good, or indicate the object in view. I threw away a great many varieties at every digging till the fourth year. I had but three families, all white skin and flesh, to which I gave the name of "Stone Hill," the quality of which has been well tested by use, as they have gone into almost every State in the Union, and have been exhibited at very many fairs, and always attracted notice, and a premium.—*A. D. Bulkeley.*

E.

LUXURIES OF A FRUIT GARDEN.

A friend of ours, in whose reliability we have implicit confidence, has a small plot of ground, of which he tells us the following facts:

From a row of currant bushes, about eight rods long, he and his neighbors gathered over two bushels of currants this year. The currant season, from the first picking to the last, was, from June 1st to August 15th, two and a half months.

From a row of gooseberry bushes, two rods long, he gathered about a bushel of gooseberries.

From a plot of strawberry vines, four rods long and one rod wide, he gathered nearly three bushels of strawberries. The strawberry season lasted about three weeks, ending about the middle of July.

Then his raspberries came on, and lasted about three weeks. Of these he had about half a bushel. They stood next to the strawberries in point of delicacy.

He has a number of cherry-trees. They yielded well this year. His family and friends used a bushel or so, and the children of the neighborhood fed themselves upon them, without stint, for two weeks.

Soon after the raspberries were gone, his peaches began to ripen. One of the trees ripened its fruit late, and it has lasted till within a few days past; of these he has had two or more bushels.

All along since the first of August his apples and pears have been ripening, and have furnished an abundant supply for his family, for the cow and pig, and some to sell or give away besides. He will have a large quantity of excellent winter apples. He has just gathered from two or three grapevines as many bushels of fine grapes. Some of these his wife made into marmalade, and some she has preserved in paper, for use hereafter. The best—and greater portion of the whole—were eaten as a dessert, or given to children or friends, all of whom enjoyed them much.

These are some of the enjoyments drawn from a small plot of ground during the season just closing. They were at small cost, but they sweetened many a meal, ministered to health, and added to the comfort of many guests.

Why may not nearly every man have as large a plot of ground, and as many comforts? Simply because he is negligent.—*Ohio Farmer*.

F.

HYACINTHS IN GLASSES.

Hyacinths intended for glasses should be placed in them during October and November, the glasses being previously filled with pure water, so that the bottom of the bulb may just touch the water; then place them for the first ten days in a dark room, to promote the shooting of the roots, after which expose them to the sun and light as much as possible. They will blow, however, without any sun, but the color of the flowers will be inferior. The water should be changed as it becomes impure; draw the roots entirely out of the glasses, rinse off the fibers in clean water, and wash the inside of the glass well. Care should be taken that the water does not freeze, as it would not only burst the glass, but cause the fibers to decay. Whether the water be hard or soft is not of much consequence—soft is preferable—but must be perfectly clear to show the fibers to advantage.—*Thorburn's Catalogue*.

G.

SIX BEST ROSES FOR POT CULTURE.

TEA.—*Glorie de Dijon*.—Yellow, shaded with salmon and rose. A splendid flower for all purposes. Blooms freely all winter. Form and habit of *Souvenir de la Malmaison*. *Triomphe de Luxembourg*—salmon buff, shaded with deep rose; very large; distinct and fine; very fragrant. *Archduchess Theresa*—creamy white, with yellow center; very sweet.

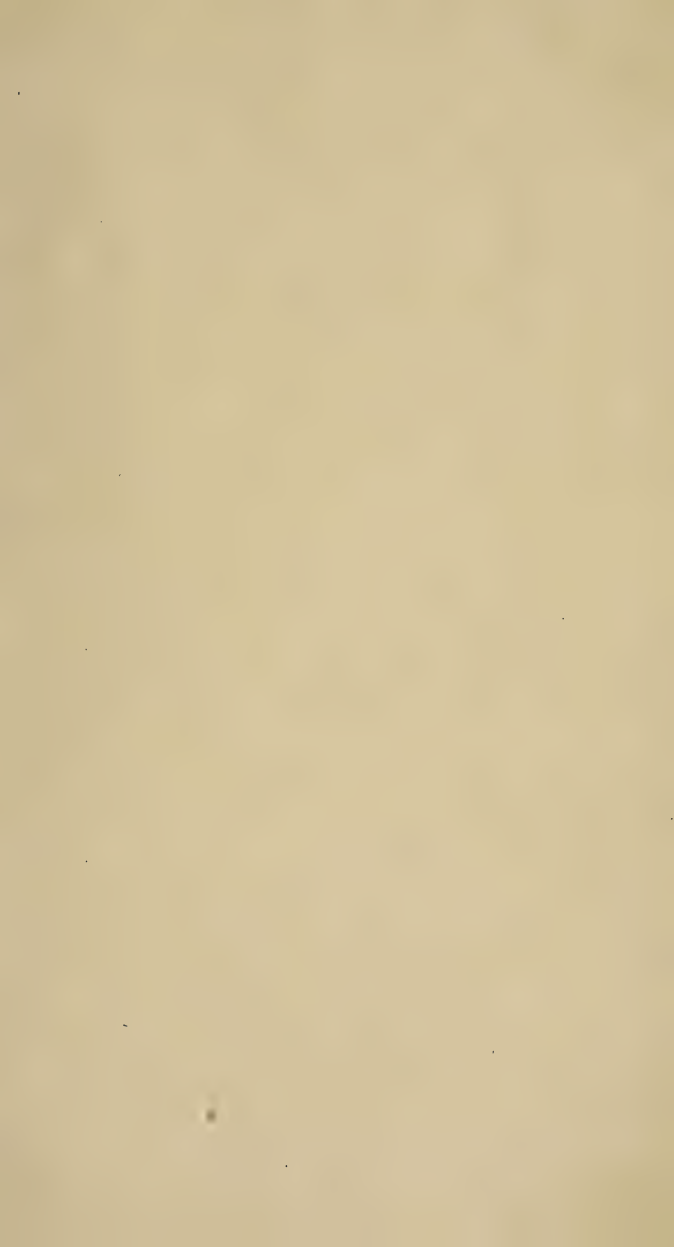
BOURBON.—*Hermosa*.—Light blush; large, full, and double; grows freely and blooms profusely. *Queen of Bourbons*—fawn color rose; beautiful, and fine bloomer.

BENGAL.—*Daily or Common*.—Bright rose; a most profuse and constant bloomer.—*Rural New-Yorker*.

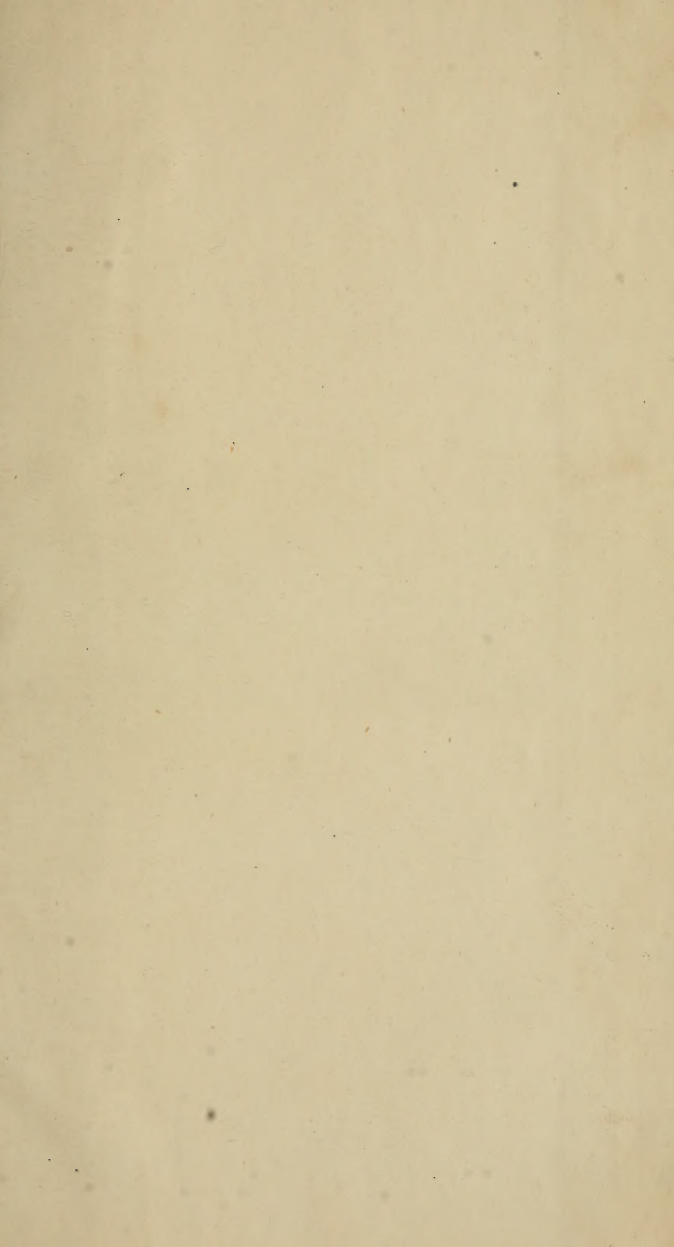
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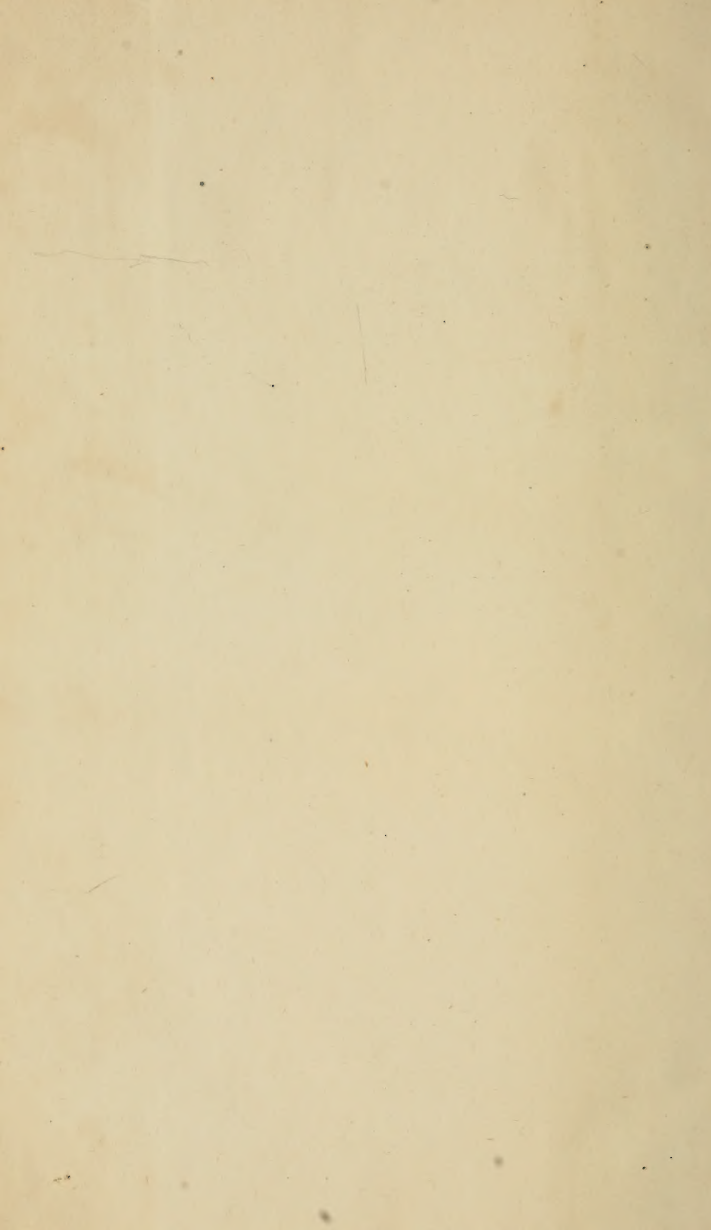
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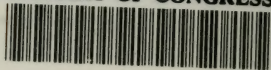








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